THE WELDING ENGINEER

THE WELDING ENGINEER, *with which is combined The Acetylene Journal*

A McGRAW-HILL PUBLICATION

Volume 33 - Number 5 May, 1948

A. M. Morris — *Publisher*
T. B. Jefferson — *Editor*
Clyde B. Clason — *Managing Editor*
John H. Giroux — *Associate Editor*
Slade Kennedy — *Research Associate*
Henry W. Young — *West Coast Editor*
George Doying, Jr. — *Chief Washington Bureau*
John Chapman — *World News Director*

T. E. Depew
Eastern Manager, New York, Tel. Longacre 4-3000

E. J. McOsker
Central Manager, Hanna Bldg., Cleveland, Tel. Main 3981

Joseph H. Allen
Western Manager, Chicago, Tel. Whitehall 7900

Roy Phelan
621 S. Hope Street, Los Angeles, Calif., Tel. Michigan 3873

John Otterson
68 Post Street, San Francisco, Calif., Tel. Douglas 4600

John Doyle
Assistant to Manager

COPYRIGHT 1948 All rights reserved
McGRAW-HILL PUBLISHING COMPANY, INC.

JAMES H. McGRAW
(1860-1948), *Founder*
JAMES H. McGRAW, JR.
President
CURTIS W. McGRAW, *Senior Vice-President and Treasurer*
JOSEPH A. GERARDI, *Secretary*
EUGENE DUFFIELD, *Editorial Assistant to the President*
NELSON BOND, *Director of Advertising*
J. E. BLACKBURN, JR.
Director of Circulation

PUBLICATION OFFICE, 210 S. Desplaines St., Chicago 6. EDITORIAL OFFICE, 520 No. Michigan Ave., Chicago 11. EXECUTIVE OFFICES, 330 West 42nd St., New York 18, N. Y.

Return postage guaranteed. Branch offices, Chicago, San Francisco, Washington, Philadelphia, Cleveland, Detroit, Pittsburgh, St. Louis, Boston, Atlanta, Los Angeles. Published monthly with an additional directory number in June.

McGraw-Hill Publishing Company, Inc. Entered as second class matter Sept. 12, 1947, at the Post Office at Chicago, Ill., under the act of March 3, 1879.

Subscription rates:

Single copy 50c. United States and possessions $5.00 per year, $8.00 for two years, $10.00 for three years. Canada $6.00 per year, $10.00 for two years, $12.00 for three years. Pan American countries $10.00 per year, $16.00 for two years, $20.00 for three years. All other countries $15.00 per year, $25.00 for two years, $30.00 for three years.

IN THIS ISSUE

COVER: *Welding aids chemical industry. The big Hastelloy-lined jacketed kettle was manufactured by the vessel division of A. O. Smith Corp., Milwaukee, for the Bakelite Co.*

Construction
Tuna Clipper 33
GERALD ELDRIDGE STEDMAN

Dam Gets a Face Lifting 46
HENRY W. YOUNG

Association
Fourth NWSA Convention 37
Golden Anniversary 45

Distributors
Distributors' Roundup 38
T. B. JEFFERSON

Research
Crack-Free Spot Welds 42
E. J. CLARK

Fabrication
Silicon Bronze Welded to Mild Steel 51
H. HOSE

Operation
Three-Dimensional Flame-Cutting 52
O. L. BAILEY

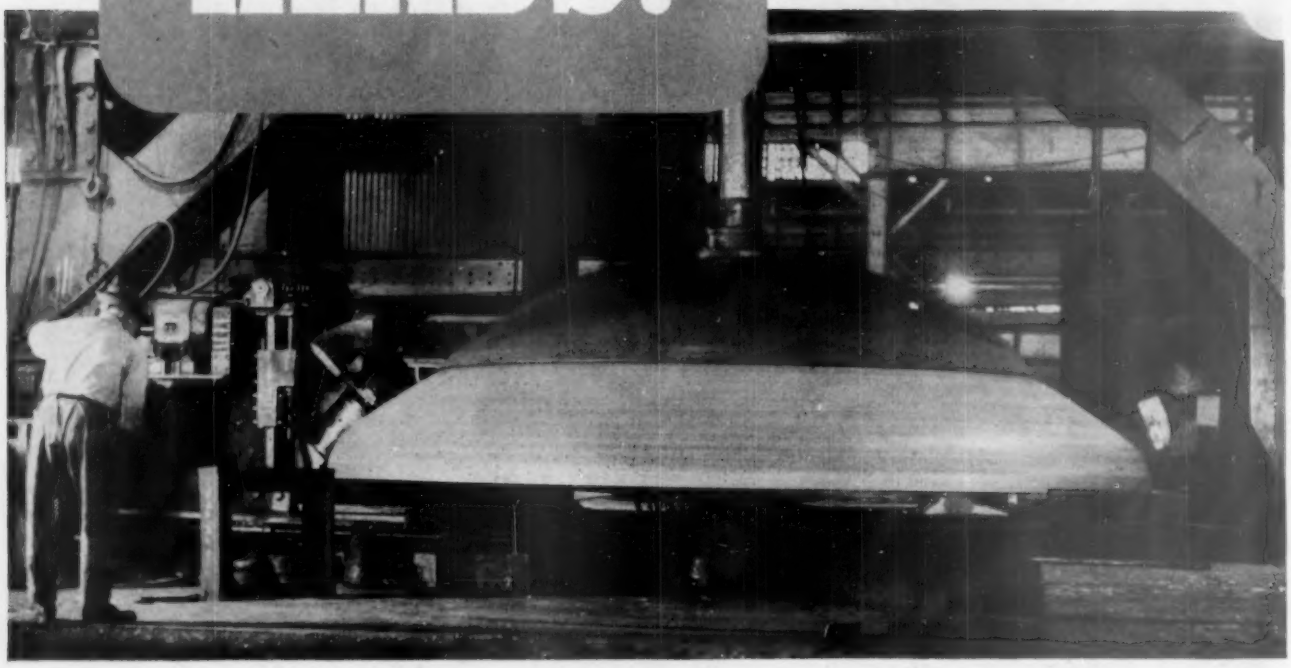
Maintenance
Farm Equipment Remade 54
ERNEST J. KOOP

Production
Welders on the Assembly Line 56
T. B. JEFFERSON
All-Welded Refrigerator Cars 60
JOHN H. GIROUX

DEPARTMENTS

Editorial 31
Engineering Data Sheet No. 92 67
Free Literature 69
New Products to Use 74
News of the Industry 82
About People 89
From the Patent Office 94
Searchlight Section 96
Where to Buy 97
Advertisers in This Issue 98

LUKENS *offers you* HEADS!



Flanged and Dished Heads—both Standard and ASME. Lukens maintains a stock of carbon steel heads in many sizes and gages, from which prompt shipment can be made.

Lukens has hundreds of dies from which all standard types of heads can be formed and is often able, therefore, to supply heads not in stock within a short time after your order is received—in all commercial metals, including clad steels.

Lukens manufactures heads in diameters ranging all the way from 4 inches to over twenty feet—the widest range of sizes and styles produced anywhere in the country. When you are working with Lukens Heads, their accurate dimensions and uniformity permit your production to move along without a hitch.

"Heads in a Hurry!" lists Lukens stock heads. The book, "Flanging and Pressing", describes 3,868 Lukens Heads. For copies, write on your letterhead to Lukens Steel Company, 416 Lukens Bldg., Coatesville, Penna.

"Head Work", a 16mm motion picture in sound and color, on spinning and pressing of Lukens Heads is available without charge. Running time: 27 minutes. Write for a booking date.

LUKENS HEADS

FOUR INCHES TO OVER TWENTY FEET IN DIAMETER

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

ESTABLISHED 1916

THE WELDING ENGINEER

MAY, 1948

Monkey Wrenches

IN THE PAST 170 YEARS, this nation has progressed further than the rest of the world did during the whole 6,000 years of civilization. An amazing accomplishment, and particularly amazing when you consider how many persons, seemingly capable and intelligent, are working to hamper progress. The welding field, unfortunately, seems to have more than its share of such individuals.

If the early inhabitants of this nation had been as reluctant to accept changes as some of the present members of society are to accept welding, we would all be living in caves or floorless hovels without windows or chimneys. I wonder if such buildings would meet with the approval of the California State Division of Architecture?

Pressure-Vessel Inspection

This august body apparently does not think too well of welding. In a recent proposal, the Division of Architecture hopes to establish as law in California the requirement that "all weld joints in school buildings be checked by X-ray or magnetic-particle methods of inspection." School buildings are singled out since present California codes specify that they must be of "earthquake-proof construction." Naturally, the provision for pressure-vessel inspection will soon be incorporated in other building codes if it is allowed to pioneer in the field of school buildings.

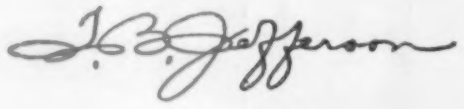
The California Architecture Division advises that this provision should not make the cost of a welded joint "prohibitive." But that is little comfort when it will make welding so costly that it cannot compete with other metal-joining methods despite its inherent superiorities. The added expense of this needless inspection would make a welded joint so costly it could no longer be used in building construction.

Of the many welded steel structures, how many have failed because of defective weld joints? Not very many. Has the number of failures been greater in welded steel structures than in those fabricated by other means of fastening? The answer to the question is decidedly on the negative side. Then why such definite discrimination against welding? Assuming good faith and public honesty on the part of the Division of Architecture, its medieval attitude can be due only to downright ignorance.

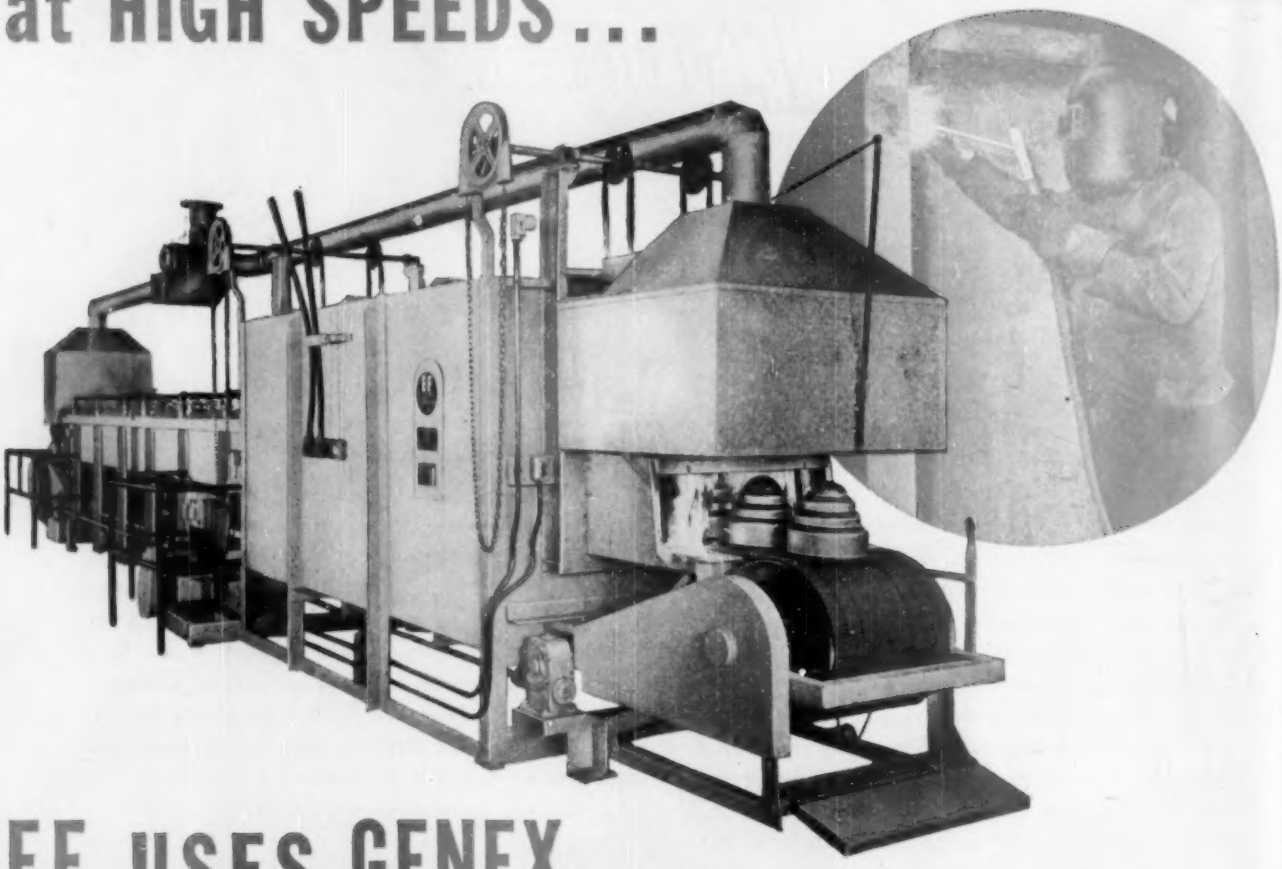
Railroads Another Example

Such ignorance is not confined to California nor to building codes. Another glaring example is to be found in the rules regulating the use of welding on railroad equipment. Welded joints on a modern Diesel locomotive are good enough to withstand the stresses transmitted by the coupler in pulling a million-ton train. But some silly little regulations say welding cannot be relied upon to support the weight of a 200-lb. switchman who might have an occasion to jump aboard a ladder. The grab irons at either end of the locomotive must be fastened by another means.

It is extremely difficult to figure out the tortuous workings of the human mind, but it is unfortunately not difficult for a few persons in authority to throw monkey wrenches in the machinery of progress. But you can't sabotage just a part of a machine. The monkey wrenches which are aimed at welding cannot help but have the unhappy effect of causing all the wheels to slow down.



For GAS TIGHT WELDS at HIGH SPEEDS...



EF USES GENEX

WELDS in the heating and cooling chambers of special atmosphere electric furnaces must be gas tight to prevent infiltration of air and escape of the protective gases used in heat treating, bright annealing, brazing and other processes.

The Electric Furnace Company, Salem, Ohio, uses Murex Genex for welding their large gas-tight furnace chambers, some of which are over 150 feet in length. This outstanding E-6012 electrode not only assures sound, tight welds, but also provides real welding economy. Genex can be used at exceptionally high currents without overheating and without excessive spatter. This means higher welding speeds . . . lower welding costs.

The M & T line includes covered and lightly coated electrodes for downhand and all-position work on mild and low alloy steels, and for stainless steels, bronze and aluminum as well as for hard surfacing and tool and die work. No matter what your problem, there is an M & T electrode to solve it. Write for catalog today.

METAL & THERMIT CORPORATION

120 BROADWAY • NEW YORK 5, N. Y.

Boston • Chicago • Cincinnati • Cleveland • Houston • Newark
Philadelphia • Pittsburgh • So. San Francisco • Syracuse • Minneapolis • Toronto

MUREX WELDING ELECTRODES
M&T ELECTRODES and GAS RODS
M&T WELDING ACCESSORIES

Tuna Clipper

Refrigerated tuna vessels can cruise as far as 12,000 miles to bring back their catches from the coast of South America. Welded construction of newer models imposes many tricky problems of sequencing

By GERALD ELDRIDGE STEDMAN

SMOOTH APPEARANCE of the all-welded plate work is readily visible on the *Lucky Star*, 106-ft. tuna clipper. The vessel is capable of 10 knots speed under full load

From the Skyroom of San Diego's El Cortez Hotel, 340 feet above harbor level, I watched tuna clippers come in by the score from South American coastal travels with catches of yellowfin, albacore and skipjack. Better than 78,000 tons of tuna are landed in San Diego in a year, enough for 3.2 million cases.

A 12,000-Mile Range

Most modern tuna vessels are of all-welded steel construction. The most popular steel model is a 106-ft.-long Diesel-powered refrigerated vessel capable of a 12,000-mile sailing range—which permits fishing off the coast of Costa Rica or South America below the Galapagos islands.

Such welded steel tuna vessels as this are built by National Iron Works, San Diego, whose 18-acre harbor site contains four ways, five piers (four outfitting and one oil), together with an important group of structural, foundry, blacksmith, assembly, welding, machine and pipe shops. My visit there, the 958th plant observation I have made throughout the country since 1942, was superintended by Edward Boughton, technically alert personnel director of National Iron Works.

C. Arnholt Smith, president, Dave Bell, manager of the structural steel department, and George Dew, shipyard manager, are all able administrators. The plant has fine housekeeping, and its administration building is an architectural gem. In addition to the construction of steel tuna vessels, the company fabricates considerable tonnage in structural steel for buildings and bridges throughout California, makes a well-known line of heavy-duty oil ranges (standard equipment on its tuna vessels) as well as tractors, ship hardware and fittings, winch drums, motor housings, drop-hammer castings and a diversified list of other products.

Steel Shop and Ways

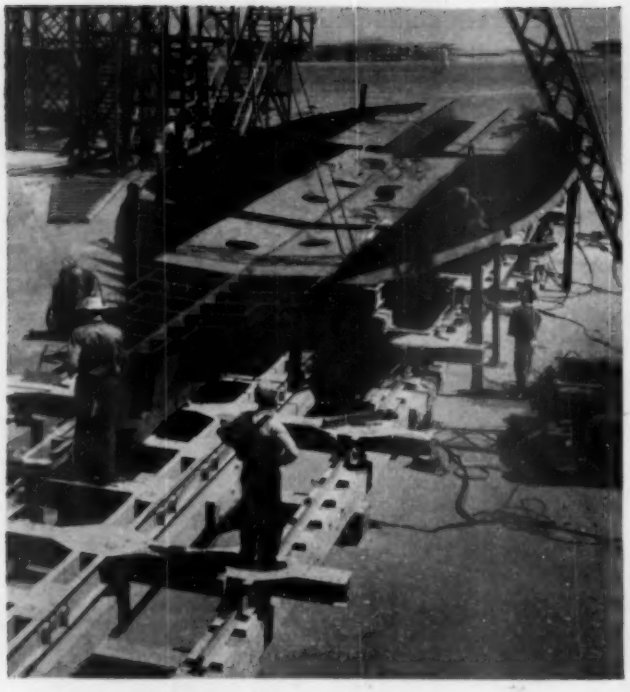
Situated in something of an L-shape to the ways, National Iron's 900-ft. structural shop, about half of it in open air, is accommodated by a 900-ft. craneway of 60-ft. span served by two 10-ton cranes. A railroad spur connects with Southern Pacific and Santa Fe lines. Side bays under roof contain subassembly and blacksmith shop activities.

As much tuna vessel construction as possible is in shop-welded subassembly sections, which are moved to the ways and installed intact. The layout and torch cutting of ship plate is done in a 200 by 300 ft. open area at the end of the structural shop. The work flows forward through shop from sub-subassembly, subassembly and into final assembly on the ways.

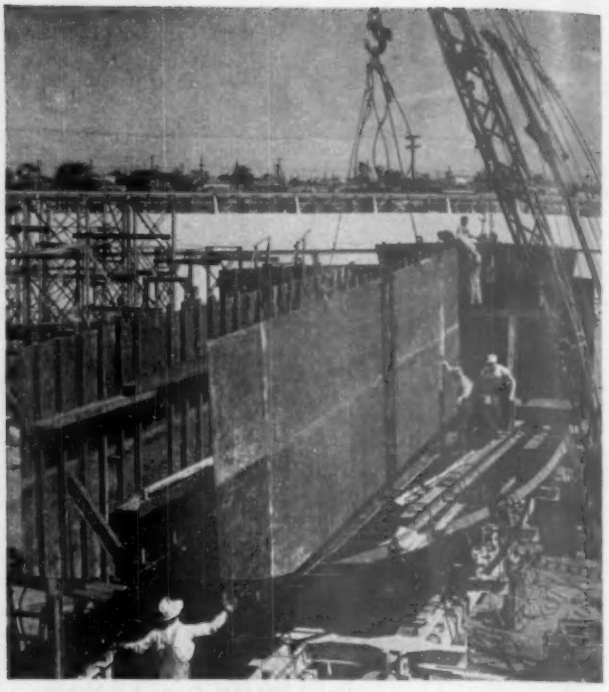
The yards are equipped with much portable steel staging and rigging to accommodate work at varied levels on the vessels. There is a wood-working shop adjacent, and the yards have considerable crane equipment: three large portables (one 6-ton, two 12-ton), two 2-ton capacity "cherry pickers." All shipyard operations are carried on under the experienced guidance of Paul Preston, superintendent, and his assistant, William Trammell, graduate naval architect.

Fishing for Business

Tuna boats have temperamental owners who get an average 47% of the catch value, must bear all expenses. The crew is paid in shares. When a school of tuna is sighted, everyone pitches in for the catch. Sometimes fascination of following the school is so intense that the skipper gets off course, postpones fathometer soundings and the ship piles up on the shoals. Fishing is done from racks, by hook and line with artificial lures, near water edge—stern port preferred. These fishing racks are really shelves held by chain, and can be folded to shipside when not in use. Using live sardine bait to "chum" or attract the tuna, fishermen throw the catch over shoulder onto deck and thence into brine wells



1 BOTTOM SECTIONS of 110-ft. tuna clipper are assembled on building cradle after shop fabrication



2 LONGITUDINAL BULKHEAD for shaft alley is here being lowered into position on the bottom assembly

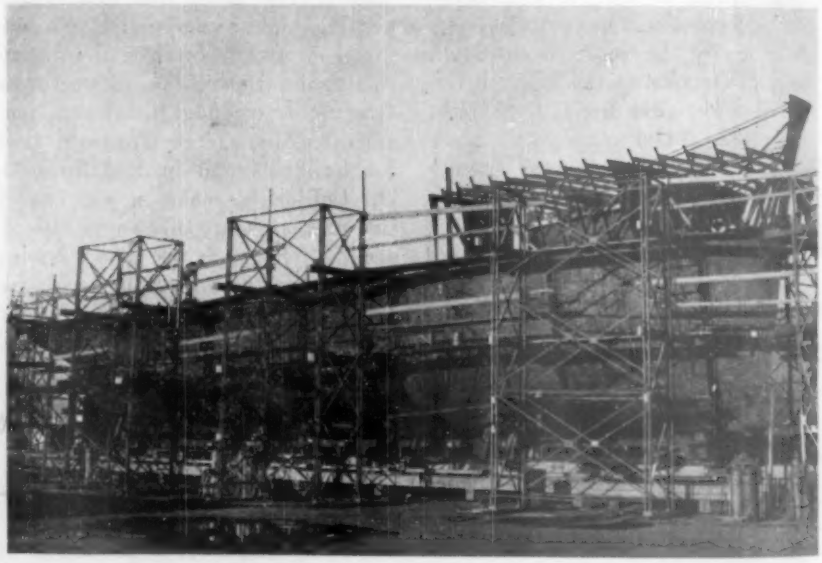
Tuna clippers are built from the bottom up. Prefabricated sections are made in structural shop

to freeze. Tuna average 100 lbs. each, may reach 900 lbs.

I crawled all over the *Lucky Star*, an all-welded tuna vessel that was just receiving its finishing touches. It carries a mast which accommodates an unloading boom and crow's-nest in which a lookout continuously rides to spot tuna schools. The vessel has four decks, beautiful bunk rooms, two stainless-steel galleys with completely modern equipment. Owners insisted that quarters and deck house be finished in mahogany. Chart room has inter-com ship-to-shore radio, fathometer sounding equipment. Speedboat is auxiliary equipment, together with life rafts. There is also an excellent machine shop. Bait is in after-wells and in stern bait boxes on deck.

The vessel is a mass of refrigeration tanks, brine wells, piping harnesses. Food storage is fully refrigerated, large enough to sustain four-month trips, and the crew certainly eats plenty of meat.

National Iron Works has a fine engineering staff with 14 draftsmen.



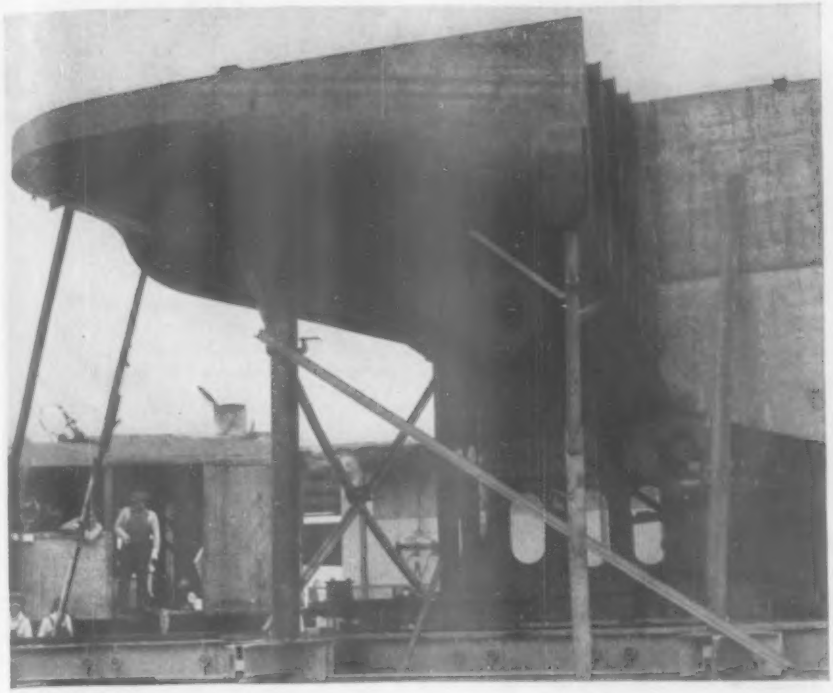
4 HULL STEEL WORK nears completion. Vessel is framed and plated to main deck; deck has been completed and forecastle is being framed

Greer Ferver, chief engineer, graduated as a civil engineer (Cal Tech 1935), took postgraduate work in advanced structures at Penn State and joined the company in 1939. The subsequent technical information is entirely from my interview with him.

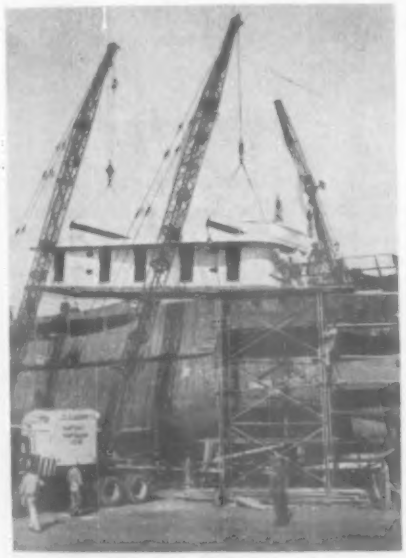
Steel welded tuna vessels of the type under discussion are designed and engineered by G. Bruce Newby, consulting naval architect, Long Beach, Calif. Mr. Trammell, the yard's naval architect, handles the yard's interests in doing design work.

Bottom to Deckhouse

"Bottoms are accomplished in three sections in our structural shops," Mr. Ferver informed me. "These include outer plating, floors, center vertical keel, keel, tank tops and other such



3 **STERN SECTION is set in place, ready to be welded to shaft alley bulkheads and bottom assembly. Stern was prefabricated in the shop**



5 **DECKHOUSE, also prefabricated, set on deck by three truck cranes**

components. They receive two closing welds on the ways.

"The shop welding of these sections is done in various jigs of our own design. There is a bottom jig that involves three pieces, a stern jig for fantail above and propeller shaft accommodations, the transverse bulkheads and the two longitudinal bulkheads which run along the shaft alley. The deck is made in large sections. All of these sections are jig work.

"Welded construction is, of course, ideal to shipbuilding and, particularly, to tuna vessels. It is not only advantageous from the standpoints of efficiency, economy and strength—with savings in man-hour construction costs—but welding is always essential to best appearance in ship design. Furthermore, the streamlined welded surface minimizes drag, creating very important operating savings as well as improving maneuverability and speed.

"We use submerged-melt automatic welding on all flat work in the shop and utilize plates as large as possible to minimize welding in final assembly on the ways. There is as much prefabrication of all components as possible. The steel structure of the deckhouse is prefabricated and lifted on deck to be welded down; the deck house is built on a steel kick plate, set down on the deck and welded. The steel bait boxes are prefabricated with the canopy over them; this entire subassembly is made up complete in our structural shops and craned into position at the ways for final welding. The only elements individually installed are such as the frames above the bilge, deck beams, side and deck plating and ceilings. These are shaped in shops and final installation is made by welding them in place on the ways.

"Most of our steel plating is ¼ and 5/16 in. thick and is welded by multiple-pass technique, chipping after each weld. A ⅛-in. gap is left between plates. Work is butt welded from one side, then chipped out to the root of the weld from the other side before welding is started there. Thanks to Paul Preston, we are improving our welding techniques constantly, and we believe we have the nicest steel work of any comparable vessels," Mr. Ferver convincingly concluded.

Working out Stresses

Sequence welding is fundamental to the N. I. W. technique. It follows a basic procedure, up and outward from center of keel, with some minor exceptions. It is hard, theoretically or practically, to predict the welding stresses that will actually develop. Sequential welding permits these stresses to work out naturally to the ends. Otherwise there would be an accumulation of stresses that would show as rise at the stern after decks were installed. The technique holds this at a practical minimum. "We don't close off T-welds," Mr. Ferver pointed out, "until sections are completed."

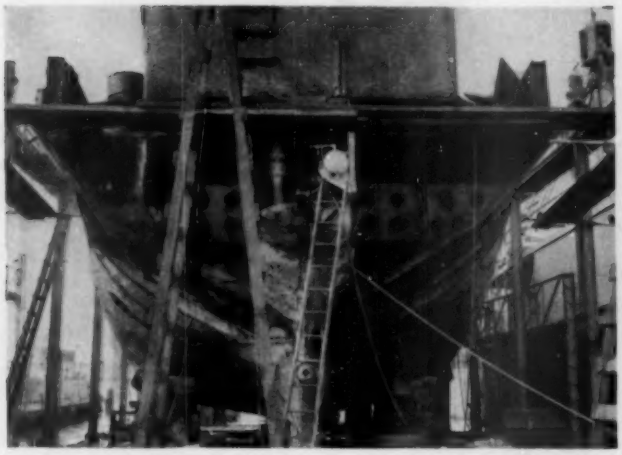
The overall sequence employed in final welding is to work out from centerline port and starboard, forward and aft from midship and from bottom up. Shell and tank top are completed before decks.

Longitudinal girders are assembled with deck section; in welding longitudinal girders to bulkheads, vertical welds are made first, then overhead and flat prior to welding deck butts.

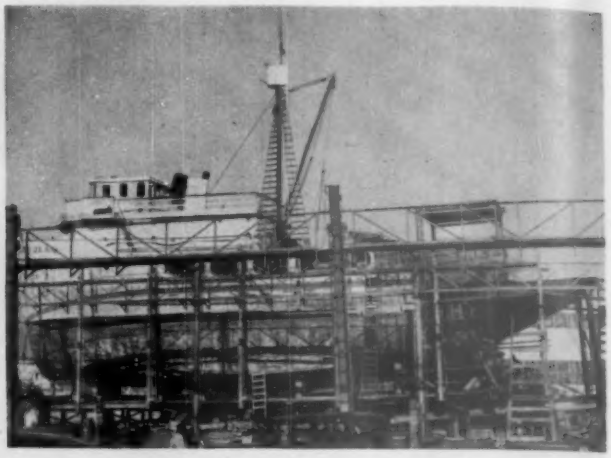
Inner bottom sections are welded together between frames, starting at inside shell at centerline and using backstep technique, both port and starboard simultaneously. First pass on outboard side begins at center vertical keel and progresses out and up, after chipping to clean metal. Gunwale welds must be peened, and peening is done after weld has cooled. Closing welds must also be peened. Transverse main deck butts over bulkhead flat bar are welded before plug welds to beams.

In the welding sequence, port and starboard sides are welded simultaneously to minimize distortion.

***Lou Jean* gets a new welded stern. N. I. W. foresees many more jobs of this kind**



IMPROVED LINES were given to the *Lou Jean* by new stern. Here the old stern has been amputated and workers are trimming the stump to receive the new section



NEW STERN was grafted into place by welding. When skin plating has been added, patient will be a better boat than before, with longer lines and greater buoyancy

Pick-up welds are avoided if possible. All butt welds are made with one or more backstep passes and wire-brushed after each pass.

Bulkheads are assembled on platen butts and prefabricated by automatic welding. After machine welding of seams is completed, stiffeners are production welded to the plates.

In assembling fore and after body, welding starts at keel plates and progresses out and up. Seams at centerline bow and stern are welded simultaneously, port and starboard, from keel bottom up.

Deck, deck beams and girders are assembled on platen in a sequence similar to bulkheads. Hatch coamings are welded to deck sections after welding of deck sections is complete.

Fender is tack welded in place for height. Weld butts start at midship and follow with top and bottom fillet welds, working towards ends.

Bottom Sequence

The sequence of steps in welding inner bottom is as follows:

1. Place first tank top plate on jig and weld butts.
2. Weld center vertical keel butts.
3. Tack first tank top plate to center vertical keel and production weld.
4. Place longitudinal flat bar in way of first and second tank top plate seam and tack to first tank top plate.
5. Place floors and weld to center vertical keel.
6. Weld floors to first tank top plate and longitudinal flat bar.
7. Place and weld butts of flat keel or "A" strake.
8. Tack weld flat keel or "A" strake to center vertical keel.
9. Weld floors to flat keel or "A" strake.
10. Place margin plate, weld butts, then weld to floors.
11. Weld butts of "B" strake.
12. Weld seam of "B" strake to flat keel or "A" strake.
13. Weld "B" strake to floors.
14. Place prefabricated box keel sections on flat keel or "A" strake and weld butts.
15. Weld box keel to flat keel or "A" strake.
16. Turn section over and production weld center vertical keel to flat keel or "A" strake.
17. Complete welds of seams.

17a. If "C" strake is to be installed on inner bottom sections, proceed as noted on blueprint. Then weld floors to "C" strake, and weld margin plate to "C" strake.

18. Machine weld butts, then weld to second and third tank top plates in sections as indicated.
19. After "C" strake has been installed and all welds to it have been completed, place sections of second and third tank top plates in place and weld connecting butts.
20. Weld longitudinal seam between first and second tank top plates.
21. Plug weld second and third tank top plates to flat bars on floors starting inboard and working outboard.
22. Weld tank top plating to margin plate.

In concluding these notes on welding sequence, it might be mentioned that flat decks are welded similarly to bulkheads.

Adding a New Stern

The *Lou Jean*, originally built in another California yard, lacked buoyancy at the stern. The owners, dissatisfied with her lines, wanted them lengthened. So Trammell's staff made models to show the owners the lengthened lines for greater buoyancy, lofted these lines and built a new stern section in company shops. With the vessel on the ways ready for remodeling, some discrepancies in the measurements furnished showed up and had to be adjusted. The new stern was then installed. Joints were reinforced with tie plates, but the joining was otherwise accomplished entirely by welding. The result is a greatly improved fishing boat with longer, more efficient lines and far more buoyancy. National Iron Works expects many more such jobs.

Dave Bell, structural steel department manager, has inculcated a family spirit in which turnover, absenteeism, lost-time accidents and supervision ratios are enviably low. He makes use of an incentive system. A percentage of profits is reserved for retirement funds at no expense of employees.

ST. LOUIS. Hotel Sheraton (formerly Coronado), where welding distributors hold their annual convention

Fourth NWSA Convention

National Welding Supply Association holds annual meeting in St. Louis, May 20 and 21

AN INTERESTING and constructive program is being planned for the fourth annual convention of the National Welding Supply Association, to be held this month at the Sheraton Hotel (formerly the Coronado), St. Louis.

The meetings will take place on Thursday and Friday, May 20 and 21. Registration, however, may be made on Wednesday from 3:30 to 9:00 p. m., and a preconvention meeting of the executive committee and board of trustees will be held at 6:00 p. m. Wednesday evening in the Pine Room.

TWO DAYS' PROGRAM

Thursday's program begins at 9:00 a. m. with the registration of delegates in the hotel's West Lounge. First event is a general meeting of the entire association, to be held from 10:00 to 12:00 a. m. in the Crystal Room, after which luncheon will be served at the Club Caprice.

Beginning at 2:00 p. m., the afternoon will be devoted to separate sessions for the distributor and manufacturer members of the association. Distributors hold their meeting in the Crystal Room, manufacturers in the French Room. Following these business talks, the two groups get together again for a reception at 6:00 p. m. and an informal dinner served at the Club Caprice at 7:00 p. m.

Friday's program starts at 10:00 a. m. with another general session of the entire membership in the Crystal Room. After a two-hour interruption for luncheon at the Club Caprice, the general session in the Crystal Room resumes at 2:00 p. m.

More detailed information regarding convention speakers and their topics was not available at the time of the present writing. It is safe to say, however, that the membership of the program committee insures that a strong program will be presented. The committee consists of: R. S. Mars, W. P. & R. S. Mars Co., Duluth, Minn., chairman; F. P. Kohlbry, Machinery and Welder Corp., St. Louis, vice-chairman; R. C. Waldie, Williams and Co., Pittsburgh; Ray Koltes, Red Arrow Sales Corp., Madison, Wis.; Ralph E. Chase (ex-officio), Chase Welding Supply Co., Inc., Benton, Ill.

TRADE SHOW, TOO

In connection with the convention, a trade show is being planned. This will also be held at the Sheraton Hotel in a room adjacent to the meeting room. The right to exhibit will be restricted to manufacturers who are associate members of NWSA.

STORE **Burdett Oxygen Company, Cleveland, relies on a carefully planned city store. Behind the 60-ft. counter are over 500 linear feet of steel bins, holding some 1,500 different items**

Distributors' Roundup

Key factors in the success of welding supply distributors seem to be ingenuity and willingness to work hard. Here are some ingenious ideas that have done well for other distributors

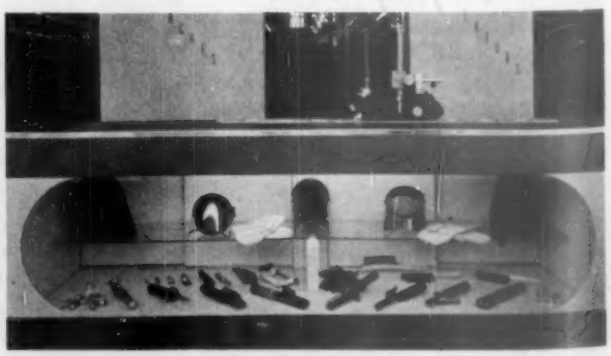
BY T. B. JEFFERSON

EVERY welding supply distributor is anxious to be successful, but as the old negro spiritual goes, "Eberyone talking about heab'n ain't gwine git there." Some distributors do reach their goals, but many more find that their businesses lack the qualities which make them successful.

Surveys of the Department of Commerce show that 50% of all new businesses fail within two years, while only 10% remain in existence

DISPLAY

OPEN DISPLAY as in chain drug and variety stores helps boost business for Ralph LeMaster, Los Angeles



SHOWCASES at Burdett Oxygen are regularly changed in accordance with best tenets of department stores

TRUCKS **Left: "Office" of wheeled store operated by the Bakersfield (Calif.) Machine Co. Right: Compartments for accessories in truck of Kankakee (Ill.) Welding and Supply**

to the end of five years. Obviously, 90% of all new enterprises fail to find the keys to success. The above ratios apply to businesses of all kinds, but they hold quite true so far as welding distributorships are concerned.

Editorial Investigation

During the past year, the editors of The Welding Engineer have called on many distributors, located in all sections of the United States, and asked questions. It was the object of these visits to see if there are any set patterns that can be followed to make the welding supply business a guaranteed success. After many such interviews, it becomes apparent that success isn't a matter of rule or rote; it is based primarily upon the ingenuity of the proprietor of a particular establishment.

Of course, there are certain factors that do contribute to success. A welding supply business set up in an area where no welding was done would naturally be in for an extremely rough time. Dismissing this obvious example of failure, however, we find that even in localities where considerable welding is being done there are marked degrees of difference between the amounts of business of various welding supply distributors.

No Easy Road

It is the desire of every welding supply distributor to emulate the successful. Slavish copying of others' methods, however, is not enough. The truth is that success must be attributed to the tissue of overall operations, not to any one factor.

In their calls and questions, the editors of The Welding Engineer have found that one distributor will attribute his success to unique sales

TAIL GATE HOIST facilitates handling of heavy cylinders for Purity Cylinder Gases, Inc., Grand Rapids

LOW BED of truck owned by Absco Welding Equipment and Supplies, Los Angeles, also helps handle cylinders

SERVICE

ONE MAN repairs and reconditions torches and pressure regulators at Kankakee Welding and Supply Co.

REPAIR DEPARTMENT of Purity Cylinder Gases is centralized at Grand Rapids, serves also three branches

methods, while another will point to successful advertising or effective packaging or an attractive retail store. So it goes down the list. No two distributors point their fingers to exactly the same key for successful operation. Each picks out one or more dominant ideas and plays them hard. Examples of such ideas follow:

Chain-Store Displays

A Southern California operator believes that a welding distributor should be as up-to-date and aggressive in merchandising as a drugstore. He had this thought in mind when he began looking for a location for his store. A careful study was made to find a location that would be most convenient to a majority of customers and potential customers.

The most desirable location theoretically would be a spot that was located in the center of a circle around which the customers and prospective business would be distributed uniformly in all directions. Having found a location close to this ideal, he took full advantage of all the display ideas developed by chain stores, reasoning that such merchandising would also secure business in the welding field. Several other distributors, it was found, place their main reliance on attractive stores and handsomely arranged displays. Others, equally successful, neglect this phase of operation.

Exhibits at County Fairs

Several distributors, particularly those serving rural areas, have tried novel means of attracting the rural customer. One welding supply distributor in the middle west found that sales of welding equipment were increased materially by exhibits at various county fairs. He has been so succesful that local competitors are copying him and likewise exhibiting. There seems to be plenty of business to go around, though, and little or no effects are felt from the competition.

The county fair exhibits are planned to show what this welding supply organization has to sell and to attract attention by unusual applications of welding and flame-cutting. Through newspaper advertisements, farmers are invited to bring broken equipment to the fair to be welded. The salesmen are in the booth to try their hands at solving the many different problems that come their way. The man who can do a tough repair job successfully while the eyes of a crowd of farmers are focused on him is sure to win converts to welding. Needless to say, this distributor has also built up an incalculable amount of goodwill.

Everything that is exhibited in the fair booth is for sale. This includes the demonstrator welder. The exhibit has the price of each item plainly marked in large chalk figures so that everyone can see it at a glance. As a rule, everything is sold and delivered before the fair closes on Saturday night so all that has to be taken home are the exhibit signs and filled order books.

It is difficult to measure the results obtained from county fair exhibits, says this distributor, because they extend over a long period of time. For as long as ten months after the fair, someone may write in to ask for a particular item exhibited. Sales have been made as far as 1,200 miles away.

Welding Stores on Wheels

Another distributor in the middle west and a California distributor have found "welding stores on wheels" to be an effective means of selling to the rural market. Once a farmer has bought a welder, he becomes a continuous customer for welding supplies. These rural customers are serviced by a truck salesman, who drives a specially fitted truck carrying a complete line of welding equipment. Not only is the truck an aid to selling, but it saves a lot on shipping costs by delivering the merchandise at the time of selling. Large quantities of merchandise may be sold in this manner every day and left with the purchaser.

These distributors have found that by designing trucks properly suited to their task the job of selling weld-

THREE TRAINED MECHANICS at Arcway Equipment shop, Philadelphia, are able to tear down arc welders and put them together in working order

ing equipment becomes much easier. For example, one truck has a wide open space down the center of its closed body and provides ample room for heavy equipment such as welders. Along the sides are arranged open shelves and closed cupboards for the smaller items, representing practically the same stock that is carried in the warehouse. In addition, there is a small "office" to the right of the driver's seat, where all price lists, catalogs, customers' cards, etc., are carried for convenient reference. With such trucks, it is possible for the customer to climb inside and shop around among the shelves just as he would in a store.

Welding Clinics

Welding clinics have also been found to be good business getters among the successful welding distributors in the agricultural areas. These clinics, conducted by the distributor, are usually staffed with factory-trained experts who demonstrate silver brazing, the welding of white metal and other more complicated welding processes. Here, again, farmers are invited to bring their welding problems. A trained expert will demonstrate how to do special welding jobs of the kind that frequently confront those in the rural areas. For example, the hard-facing demonstrator will hard-face a plowshare, or possibly a silver-brazing expert will braze a circular saw blade. The problems discussed at the clinic need not be highly specialized; much of the work done involves nothing more complicated than the brazing of machinery parts of cast iron or, possibly, the gas welding of some nonferrous material.

Frequent Deliveries

Such clinics are business getters since they initiate the rural user into additional ways in which to employ his welding equipment. Naturally, the more applications for welding that he knows, the more supplies he will consume. In time, perhaps, he becomes a major user of welding supplies; at least that is the earnest desire of every welding distributor.

Another Southern California distributor feels that much of the success of his operations can be attributed to fast service and frequent deliveries. The four items which he feels demand frequent deliveries are oxygen, acetylene, carbide, welding rods and electrodes. To meet the demands of his top customers, he has set up three widely separated warehouses and store units, each store being under a competent, experienced manager.

This company operates a number of delivery trucks designed and built with special streamlined bodies. Since welding gases constitute the largest loads, these trucks were designed with low beds to facilitate the loading and unloading of heavy cylinders. This feature makes it possible for the driver to handle the entire load without the embarrassment of asking customers to assist him in unloading. A Michigan distributor uses a tail gate hoist in a truck to accomplish the same end.

Since daily deliveries are expensive, the California distributor has built up the idea of using his service for something besides the promotion of goodwill. The truck drivers have become an auxiliary sales force. Each driver is also a salesman, who seeks an order for the following day as soon as this day's delivery has been made.

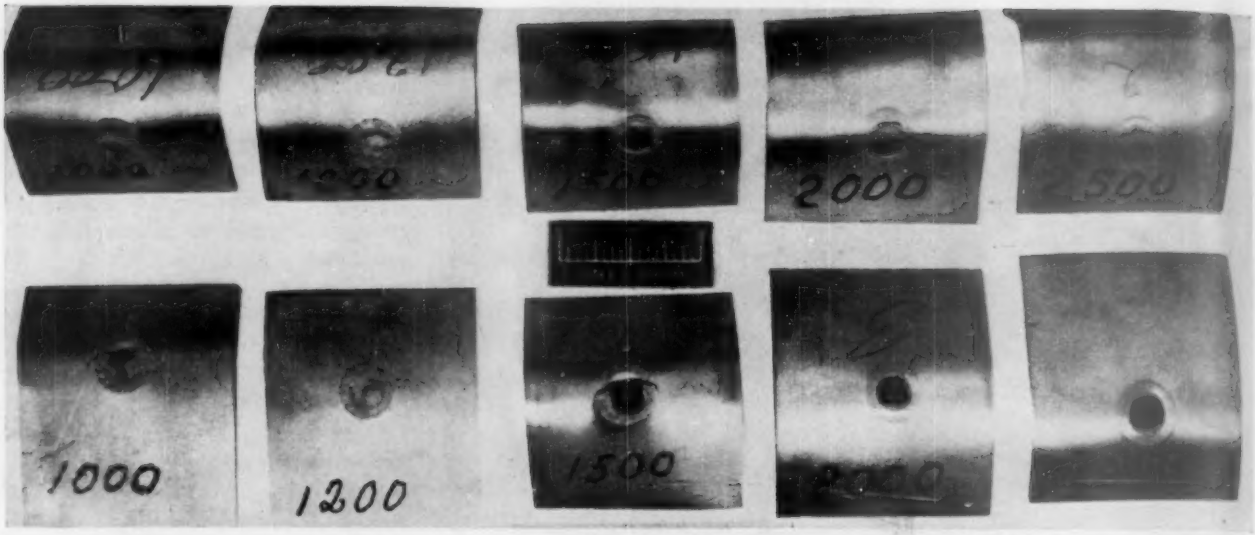
The trade has now become so accustomed to ordering from day to day that a good proportion of the company's business is produced in this manner. By taking the order on the spot, the driver saves the customer from having to telephone an order during the morning rush period. He also gets the business.

In his limited time, the driver cannot do an extensive selling job, but he is able to call frequent attention to items, pointing out a need here and a use there and always asking for the order. He carries with him the company's equipment catalog and a supply of manufacturers' literature dealing with the various lines handled. This Southern California distributor feels that he has closer contact with his customers than many of his competitors, mainly because his traveling salesmen come to know the customers through daily calls.

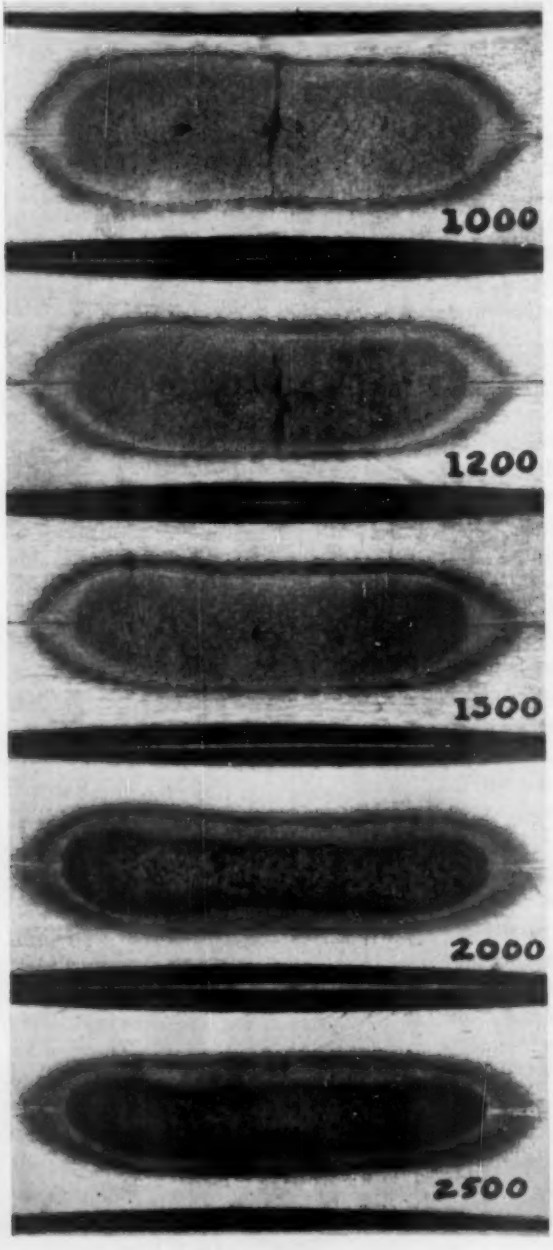
A Michigan welding supply distributor also seeks to service his customers over a large territory through the operations of multiple stores. Instead of being located in various parts of the same city, however, these stores are scattered over a wide territory, each store serving many smaller towns in between. Here again trucks play an important part.

Some 20 driver salesmen distribute welding gases and supplies. These drivers work on the basis of visiting every established customer at least once every two weeks. The trucks carry a variety of welding supplies and are designed to anticipate many customers' needs so that the merchandise wanted will be on hand to sell without previous orders. Such a sys-

(Continued on page 72)



1—PEEL TESTS indicate presence of bad parallel and perpendicular cracks for force values under 1,500 lb



2—ETCHED specimens (9X) expose only cracks perpendicular to faying surfaces. The 1,500-lb specimen appears to be essentially sound, though of less dense structure than the two below it

Crack-Free Sp

Only way to attain spot welds free from internal cracks is to increase electrode pressure, it is indicated by this series of different tests conducted in spot-welded specimens of 0.064-in. 24ST Alclad aluminum-alloy sheet

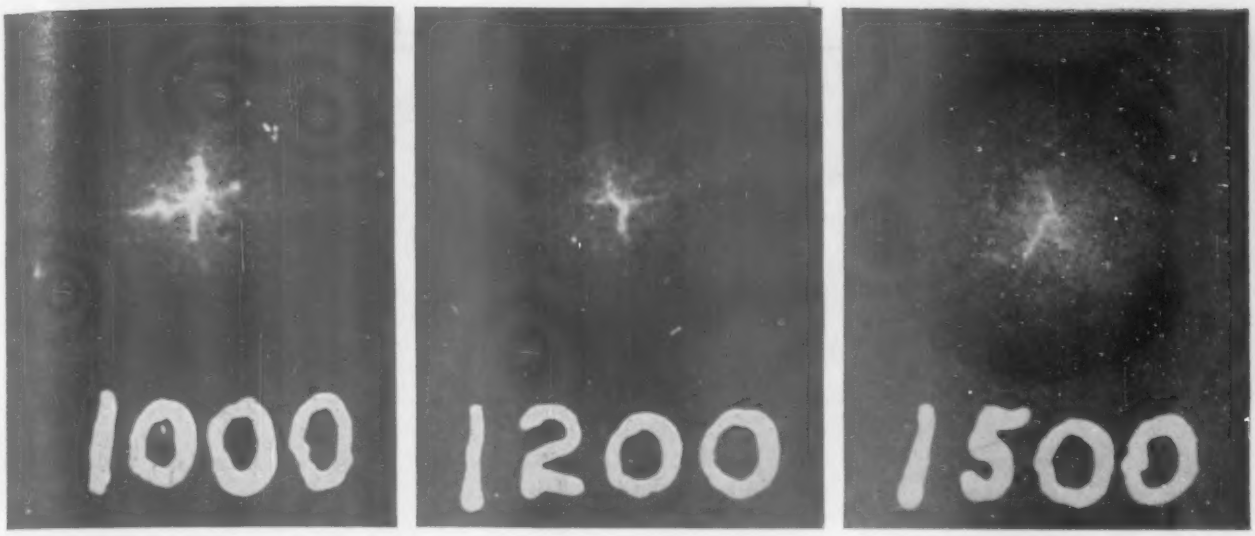
BY E. J. CLARK
Thomson Laboratory, Lynn, Mass., General Electric Co.

DESIGN trends now point toward extensive use of the aluminum alloys in more complex and highly stressed structures. In order to meet these conditions, spot-welding quality must be maintained at a high level. Process control procedures are becoming more exacting, and with this the need for approaching optimum welding conditions becomes more acute.

The problem of internal cracks is now under investigation. Some sources advocate the X-raying of welds as a standard production control procedure. Except for extreme or unusual conditions of loading, the hazards presented by such defects are debatable. Nevertheless, it is felt that crack-free welds are desirable within the possibilities of the available welding equipment.

Tensile-shear, etch, peel and exography tests were made to determine the force requirements for making crack-free spot welds in 0.064-in. 24ST Alclad aluminum with a-c equipment. While the information gathered is of limited scope, it may serve as a guide in the consideration of equipment requirements for other gauges of stock or other alloys.

Summarized briefly, the tests indicate that the only way crack-free spot



3—EXOGRAPHS (5X) of cracked welds. Note the progressive reduction in crack size as force values are increased

e Spot Welds

welds can be produced in the dural alloys is through the use of comparatively high electrode pressures. In 24ST, high-quality welds require the use of relatively heavy equipment.

The first three tests are the types normally used for qualification of process and process control. All three are often applied for qualification, while for process control two of the tests are more often used. For certain commercial contracts, only the peel test is used.

Exography is being used on some applications to aid in the establishment of optimum procedures, but it is not felt to be needed for controlling an established process.

Equipment and Electrodes

All welding was performed on a 200-kva air-operated a-c press-type welder, having a head operated on roller bearings and incorporating a rubber-bellows type of compression chamber (air cushion). Welds were made with a throat depth of 18 in. The machine has a maximum applied force of 3,300 lb (at 80 psi air pressure) and is fully automatic in its operation. "Squeeze" and "hold" time are controlled by an electronic sequence timer, and timing and current are controlled by a full electronic panel incorporating phase (heat) and timing controls.

All current readings were made with a switchboard-type pointer-stop ammeter, operated from a current transformer connected in the primary circuit and calibrated to give direct readings of secondary current.

The electrodes used were of $\frac{7}{8}$-in. diameter (No. 3 Morse taper) and were made from Resistance Welder Manufacturers Association Group A, Class I, Alloy. They were machined with 2-in. spherical radius faces and were efficiently water cooled within $\frac{3}{8}$ in. of the faces.

Preparation and Procedure

24ST aluminum sheet stock (0.064 in. thick) was sheared into $1\frac{1}{2}$ by 5 in. test pieces. These were degreased, and the surfaces were prepared for welding by scratch brushing them with a power-driven rotary brush 4 in. in diameter. This brush had 0.003-in. nickel-silver bristles and was operated at 3,450 rpm. All welding was done within one hour of scratch brushing.

At the outset of the job, it was assumed that at least 1,500 pounds of force would be required for making crack-free welds. In order to cover an adequate range, force values of 1,000, 1,200, 1,500, 2,000 and

4—SOUND WELDS are revealed by these two exographs (5X). Welds were made with force values of 2,000 and 2,500 lb respectively

Table I. Summary of Settings and Test Results

Force (lb)	Current (amp)	Time (cycles)	Tensile-Shear Strength 1	2	3	Avg.	Peel Test	Etch Test	Exographs
1,000	27,000	10	1,390	1,520	1,610	1,506	Poor	Bad cracks	Bad cracks
1,200	28,000	10	1,360	1,390	1,240	1,330	Poor	Bad cracks	Bad cracks
1,500	30,000	10	1,290	1,290	1,160	1,246	Normal	Essen. sound	Slight cracks
2,000	33,000	10	1,120	1,140	1,090	1,116	Normal	Sound	Sound
2,500	36,500	10	1,330	1,210	1,230	1,256	Normal	Sound	Sound

2,500 pounds were selected for checking points.

It was decided that a fixed timing would be used throughout the extent of the investigation. Based upon past experience, a value of 10 cycles was selected.

Present process control procedures call for "aiming values" for spot-weld size to be equal to the square root of (t), (t) being the thickness of the thinner member of a two-ply joint. Based upon this formula, the weld size selected was ¼ in. This size and corresponding welding-current values for each of the force values were attained by trial-and-error and checked by making etch tests and measuring the diameter of the weld nuggets.

Weld Specimens

After determination of the welding current and confirmation of weld size, ten specimens were made for each of the five values of force. These were:

Three standard tensile-shear specimens with a 1½-in. overlap, welded in the center of the overlap.

Three two-ply assemblies for peel tests, with edge distances of ¾ in. minimum.

Three two-ply assemblies for etch tests with edge distances of ¾ in. minimum.

One two-ply assembly for X-ray, having three spot welds on the centerline of the stock at 1¼-in. pitch.

• • •

The strength of the individual tensile-shear test specimens is shown in Table I, together with the average for each group.

One peel-test specimen (out of three) from each of the five force groups was selected as representative of the group. These specimens were photographed, and Fig. 1 shows the appearance of the joint failures.

One etched specimen (out of three) from each of the five groups was selected as representative of the group. The photomacrographs of these samples are shown in Fig. 2.

X-Rayed Welds

Each of the five specimens for exograph tests contained three X-rayed welds. One of the three welds from each specimen was selected as representative of the group and was enlarged five diameters. These exographs are shown in Fig. 3 (cracked welds made with force values of 1,000, 1,200 and 1,500 lb) and Fig. 4 (sound welds made with force values of 2,000 and 2,500 lb).

Table I gives a general tabulation of the test results, based upon the respective machine settings that were used.

The welds made with 1,000 and 1,200 pounds of force showed gross defects on peel, etch and exograph tests. The unusual failures depicted in Fig. 1 indicate the presence of bad cracks, both parallel and perpendicular to the faying surfaces. Peel tests at 1,500 lb force and above are normal, tearing a slug approximately the size of the weld nugget.

Photomacrographs

Generally speaking, the photomacrographs (Fig. 2) expose only the cracks that are perpendicular to the faying surfaces. The 1,500-lb specimens appear to be essentially sound, although of less dense structure than those produced with higher pressure.

The exographs (Figs. 3 and 4) show a progressive reduction in cracks as the welding pressure is increased. Cracks still exist in the 1,500-lb specimens, but are absent in welds made with 2,000 and 2,500 lb of force.

Defects shown by the aforementioned tests could not be consistently demonstrated by tensile-shear tests. All of the samples failed due to a shear at the faying surfaces, which left little or no indication of weld quality.

It is interesting to note that the poorest group of welds averaged 390 lb (35%) higher tensile-shear strength than did the high quality welds made with 2,000-lb force. The consistency of strength for this group was, however, much poorer, varying 14.6% (of mean) as against 4.8% for the 2,000-lb welds.

What These Tests Show

Several pertinent conclusions can be drawn from the tests. It should be borne in mind, however, that electrodes, weld size and timing were constant.

A force of approximately 2,000 lb is required to produce crack-free spot welds in 0.064-in. 24ST aluminum with a-c equipment.

Welds produced with force values of 1,500 pounds and less contain internal cracks, the extent of which increases with decreased pressure. The effect of these defects upon welds subjected to various types of loading has not yet been determined.

The peel tests on the 1,000-lb and 1,200-lb welds indicate cracks parallel to the faying surfaces. These cracks were not clearly identified by any of the other tests. Tensile-shear strength consistency improves with increased pressure up to a 2,000-lb force, but tensile-shear tests are of little use in evaluating weld quality (other than shear load capacity) unless they are coördinated with other types of tests.

Golden Anniversary

International Acetylene Association celebrates its 50th year at the Book-Cadillac, Detroit, May 3-4

THIS year the International Acetylene Association is fifty years old. It seems fitting to recall that the association was incorporated in Cook County, Ill., on August 19, 1898, in order "To promote the general welfare of its members and of the public as related to the business of lighting by acetylene gas." Few of the early incorporators could have foreseen that the future would relegate acetylene lights to the mines, while the yet-to-be-born child of oxyacetylene welding would grow to a giant of vast industrial proportions.

The fiftieth IAA anniversary will be commemorated at the two-day convention and business meeting, being held May 3 and 4 at the Hotel Book-Cadillac in Detroit. The program begins at noon on Monday, May 3, with a luncheon at the Book-Cadillac. Chief feature of this event will be the presentation of the Morehead Medal to Albert A. McMillan, Shawinigan Chemicals Corp., Montreal. The presentation will be made by G. O. Carter, The Linde Air Products Co., New York City.

John J. Lincoln, Jr., Air Reduction Sales Co., New York City, will act as chairman of the luncheon meeting. The program also includes the address of the president, by Robert B. Swope, Southern Oxygen Co., Washington, D. C. The guest speaker is the Honorable George A. Drew, prime minister and president of the council, Province of Ontario, Canada.

MONDAY, 2 P. M.

Three technical papers will be presented at the Monday afternoon session. Titles and authors are: "Welding in Maintenance Work," Clayton Herrick, editor, *Industry and Welding*, Cleveland; "Welding and Low-Temperature Brazing of Transformer and Refrigerator Parts," Ward Swarthout, process engineer, Acme Industries, Inc., Jackson, Mich.; "Scraping and Heavy Cutting," V. Orange, superintendent of maintenance, Atlas Steels, Ltd., Welland, Ontario.

Adelbert C. Good, assistant professor of engineering shop, Wayne University, and C. McL. Pitts, The People's Gas Supply Co., Ltd., Ottawa, Canada, will serve as session co-chairmen.

Following the Monday afternoon technical session, the association's annual business meeting will be held at 4:30 p. m.

TUESDAY MORNING

The Tuesday sessions will be held at the Horace H. Rackham Educational Memorial. General chairman for the day is Dr. Arthur R. Carr, dean, College of Engineering, Wayne University.

Papers scheduled for presentation at the 10 a. m. session are: "Oxyacetylene Welding of Pipe," John H. Zink, president, The Heat and Power Corp., Baltimore; "The Acetylene Cylinder Industry's Unique Container," Charles Ness, manager, acetylene research department, The Linde Air Products Co., Indianapolis; "Practical Safety Considerations in Oxyacetylene Applications," J. I. Banash, consulting engineer, International Acetylene Association, Chicago; "Oxyacetylene Cutting—Scope, Methods and Equipment," R. F. Helmkemp, engineer, Air Reduction Sales Co., New York City.

Session co-chairmen are William E. Stirton, principal, Cass Technical High School, and Otis L. Smith, Weldit, Inc.

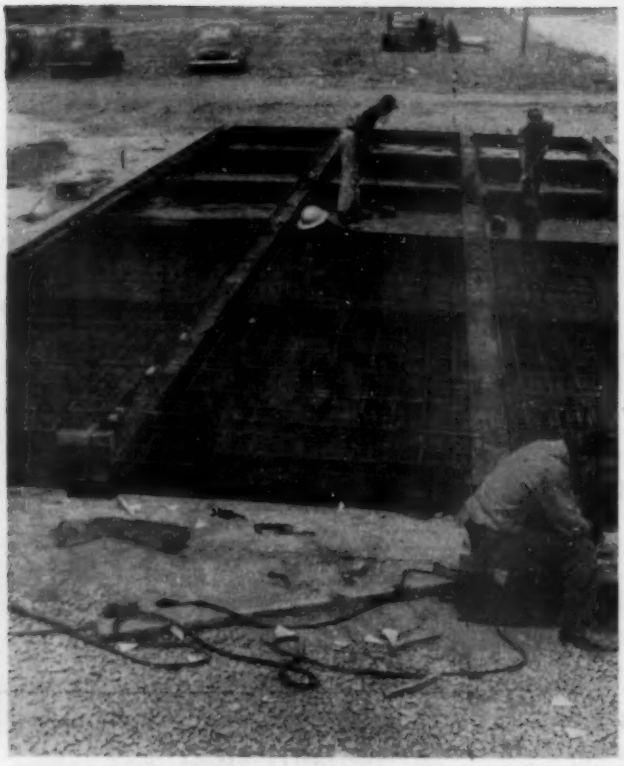
DETROIT: Hotel Book-Cadillac where members of the International Acetylene Association meet for their golden jubilee, May 3 and 4

Luncheon will be served at 12:30 p. m. Tickets for this luncheon and the one for the preceding day should be ordered in advance from the IAA secretary; prices are $3.50 and $3 for first and second lunches.

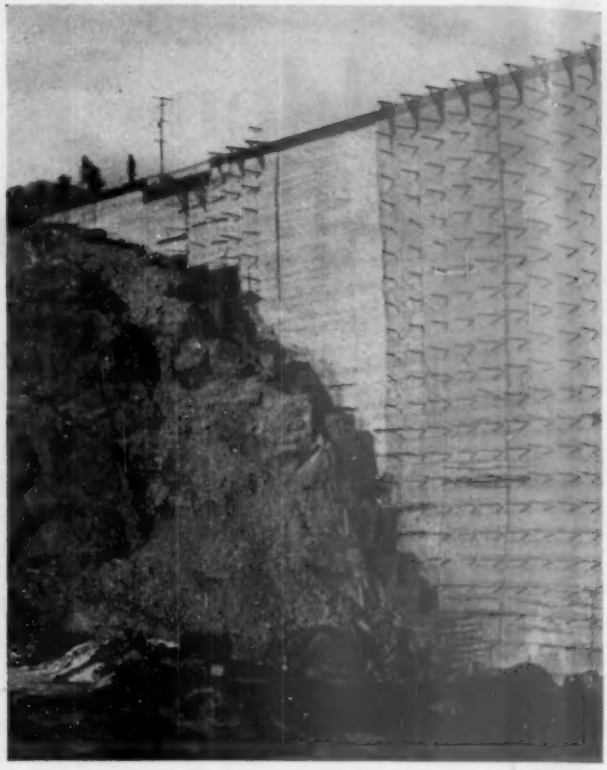
TUESDAY AFTERNOON

Four more technical papers will be presented at the afternoon session, beginning at 2 p. m. These are: "Flame-Hardening — Principles, Applications and Equipment" (author to be later announced); "Mechanized Oxyacetylene Welding" (supplemented by a color motion picture of high-speed continuous tube welding) by H. O. Jones, mechanical welding specialist, Air Reduction Sales Co., New York City; "Oxyacetylene Flame Conditioning," R. F. Cuke, Canadian Liquid Air, Ltd., Montreal, Canada; "Low-Temperature Stress Relieving—Principles and Practices," T. W. Greene, engineer, The Linde Air Products Co., New York City.

Session co-chairmen at this final session are Dr. Charles G. Duncombe, director of the department of chemical engineering, University of Detroit, and Fred A. Wirth, National Cylinder Gas Co., Detroit.



1—FORMS FOR PRECASTING had welded reinforcing grids. Dowels are the vertical rods, six to each slab



2—ANCHOR RODS on sections of face. About 6,000 holes, each 3 feet deep, were drilled for these rods

Concrete slabs were skin grafted to the wornout face of Barker dam by lap welding steel dowels embedded in the slabs to steel anchor bars grouted into the face. Intervening space was then backfilled

Dam G

BY HENRY W. YOUNG

AFTER 36 years in service, Public Service Company of Colorado's Barker dam, 17 miles from the city of Boulder, had evidenced bad disintegration on the upstream face. This was due to the freezing and thawing cycles and is understandable from the fact that the reservoir, which is at an 8,200-ft. elevation, is drawn down in the late fall and winter months. In some places, it was found that the original concrete had been frost damaged to a depth of three feet, the average being about five inches. A program of rehabilitation was undertaken to restore this upstream face and increase the stability of the structure by deep foundation grouting and drainage, which had not been done in the beginning.

The plans and specifications were prepared by Raymond E. Davis, consulting engineer of Berkeley, Calif. W. T. Neelands was the resident engineer. The contractor was Intrusion-Prepakt, Incorporated, of Cleveland, John Hofer, superintendent.

General Work Plan

Use of welding in connection with the general plan brought out several new methods and procedures. In order to make clear what the welding applications were, it will be necessary to give a brief outline of the general plan:

(1) The upstream face was chipped and sandblasted to sound concrete.

(2) Approximately 6,000 holes, each 3 ft. deep, were drilled in the face; in these holes 1-in. steel rods or anchor bars were inserted and grouted. The holes were larger than the rods and on an incline so that they could be filled with grout before the bars were inserted.

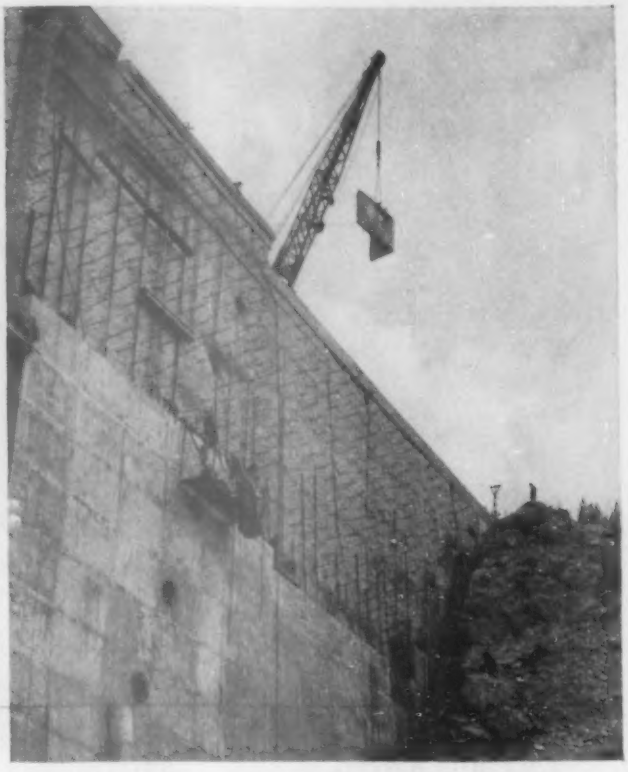
(3) Foundation rock was grouted, a drainage system installed and a stepped footing poured to serve as a foundation for precast concrete slabs.

(4) One thousand and nine precast slabs of reinforced concrete were poured, some 6½ by 12 ft. and weighing as much as 4 tons. These slabs were set in place and attached to the dam face by protruding dowels. The dowels were lap welded to the previously mentioned anchor bars projecting from the dam face. The upright slab acted both as a form and also as a new upstream face.

(5) The space between the face of the dam and the slab wall was filled with "Prepakt" concrete to make the mass a single, solid unit. The Prepakt method consists of first placing the coarse concrete aggregates separately, as a dry mix, and then forcing in a sand-cement grout to unify the mass.

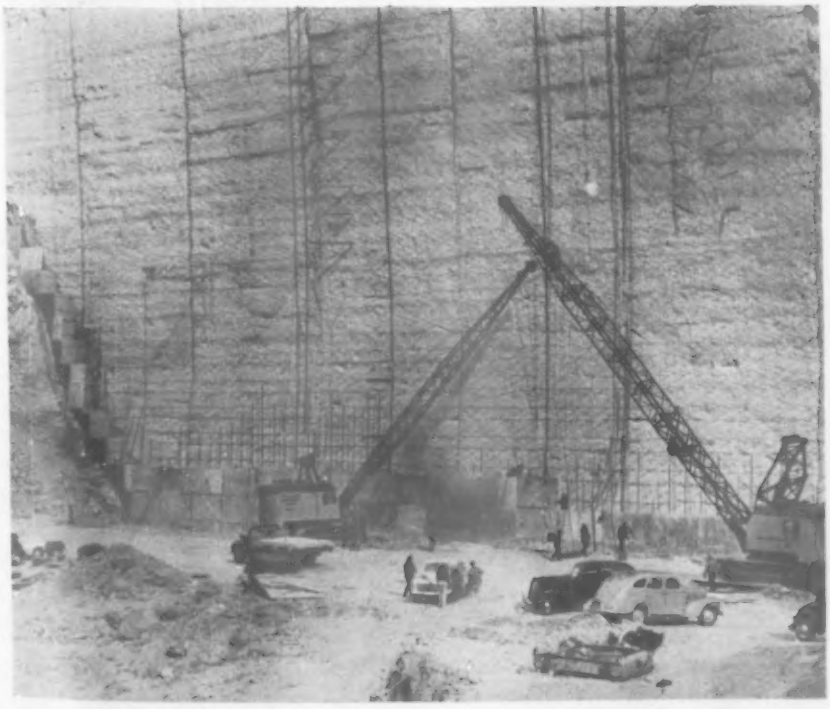
Before the above project could be carried out, a drainage tunnel had to

4—LAP-WELDED anchor bars (left) and dowels. Minimum lap of 3 in. was allowed. Both sides were welded



5—NEAR TOP OF DAM, welders are carried on suspended platforms, which are lifted as slab level rises

Gets a Face Lifting

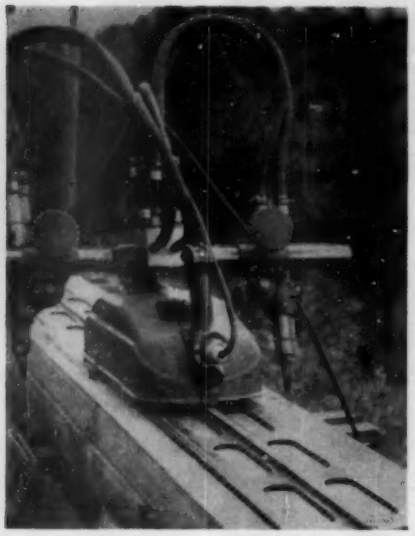


3—SLAB PLACING STARTS at foot of dam. Slabs are set edge to edge and grouted at the joints. Dowels are left protruding at backs of slabs

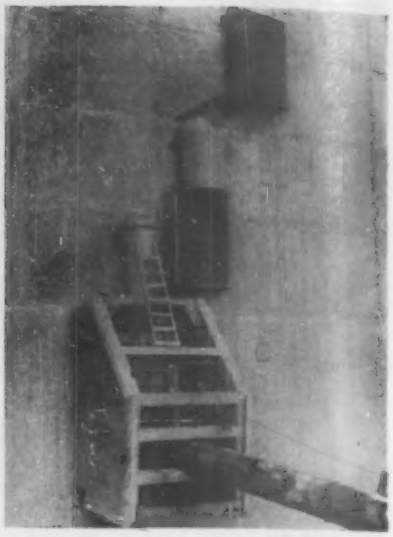
be drilled through the base of the dam. The tunnel was holed through on September 14, 1946, and the reservoir was completely empty from that date until March 28, 1947.

During the dry reservoir period, the foundations for the addition were excavated, bedrock grouted, drainage system installed, step footing constructed and the slab wall erected and backfilled. As soon as the slabs were erected and welded into position by connecting their dowels with the anchor bars, the space between slabs and dam face was filled with the dry aggregate. Approximately 12,545 cu. yd. of Prepakt aggregate were required. After the reservoir was filled and the aggregate was inundated, the interstices were filled with grout, forced into the mass through the slots in 2-in. grout pipes that had been left between slabs and dam face. The grouting was started at the bottom of the addition and progressed

6—SLOTTED pipes through which grout was forced under pressure



7—FLAME-CUTTING machine used to cut 6-in. slots in grout pipes



8—TRASH RACKS presented some complicated welding problems

upward, displacing the water as the grout level rose.

Four Main Advantages

This rather unusual concrete construction method was employed for the following reasons:

(1) Work of erecting slabs and placing aggregate could be performed during the cold winter months when conventional concreting operations would have been impossible. Hence the job could be completed during a normal period of emptying and filling the reservoir without loss of valuable water.

(2) The precast slabs of rich, high-strength concrete (6 sacks per cu. yd.) not only acted as forms during construction but later provided a watertight upstream shell of great resistance to frost action. This permitted the use of a filling concrete of low cement content (3 sacks per cu. yd.), which would insure a low temperature rise in the mass of the addition as the cement hydrated—an important item in producing an addition free from cracks and acting monolithically with the old dam.

(3) The mass of aggregate could quickly be transformed into Prepakt concrete by a continuous grouting operation performed under the cold (43° F.) water of the reservoir and with the desired water load on the old dam. Thus there could be produced an addition free of thermal stresses at normal reservoir temperatures. When dam was under full water load, a favorable state of stress would exist in all parts of the rehabilitated structure.

(4) The bond between the Prepakt addition and the old dam was much higher than could be obtained by conventional concreting methods since the grout was forced into the surface capillaries of the old concrete under the full pressure of the head of water above.

Case-Hardened Concrete

Actually, the maximum temperature of the hardening Prepakt concrete was reached in about four days after grouting; the average maximum for the entire mass was 63° F., a temperature of about 40° F. lower than would have been reached had conventional methods been employed and a conventional concrete of suitably high cement content for great frost resistance been used. The resulting face might be likened in a way to a slab of case-hardened steel.

Prepakt concrete has been used many times in the past and precast slab facing has also been employed, but the use of welded rods to hold the slabs in place so as to constitute a virtual form for the placing of the Prepakt is an original technique. Improved welding knowledge has made this method practicable.

The first application of welding was in connection with the manufacture of the reinforced-concrete slabs. These slabs were of varying dimensions. Their reinforcement consisted of ½-in. and ⅝-in. bars, together with 1-in. dowels, both of intermediate grade steel.

Five sets of steel forms with concrete bases were located in a large yard. Fig. 1 shows the welded reinforcing grids in place in the forms. The dowels, of which there are six to the slab, are looped around intersections in the lower half of the grid. The end of the loop is welded to the shaft and also to the intersecting members in the grid. The grids were held off the concrete bottom of the form by horizontal rods laid across the top of the form. These horizontal rods were attached to the dowels, which are the vertical rods shown in Fig. 1.

Fig. 2 shows anchor bars in place in a section of the dam face near one of the abutments.

Fig. 3 shows the start of the slab laying at the bottom of the dam. The slabs, set edge on edge, are grouted at the joints. About four inches of each dowel, projecting from the inner face, are lap welded to the corresponding anchor bar protruding from the dam. In the center of Fig. 4 is one of the anchor bars (left) welded to the corresponding dowel (right).

Fig. 5 shows progress of the work to a point near the top of the dam.

The contractor used six electrically driven 300 and 400-amp welders to lap weld the anchor bars to the slab dowels. Four of these machines were suspended on two platforms, swung at three points across the face and about mid-point in elevation. For

welding the lower portion, the two other welders were set on steps of each abutment and moved up as the slab level was raised. The first four were moved to the top as the slabs reached them and set on platforms secured to the outside of the downstream wall.

The entire anchor bar system was grounded by tack welding the 2-in. slotted casing pipe to vertical rows and tying the rows together with a ½-in. rod extending the length of the dam. Grounds were tacked to a bar in each row, saving the welders the delay and inconvenience of dragging a grounding lead around.

As each slab was swung into place, two weldors torch heated the anchor rod so that it could be bent easily into alignment adjacent the corresponding dowel. The weldors would then make a single-pass tack at least three points on each side of the lap before the crane released the slab.

Production weldors, who followed immediately behind the slab-setting crew, welded the bars to the dowels with three passes on either side of the minimum 3-in. lap. All of this welding was horizontal since the anchor bar in each case was lapped directly under the dowel. The first pass on a side was laid with a 5/32-in. electrode, and this was followed with two cover passes with 3/16-in. electrodes deposited with the same current setting.

After the welding of a number of slabs had been completed, the welds were visually inspected. Any that looked doubtful were proof tested to 25,000 psi, a load that they were assumed to carry, by means of a hydraulic jack. No failures were encountered.

Other welding applications on this project included: welding of the 1,500-ft. main metal drain (8 to 18 in.) embedded in the footing; welding to this main drain at every 10-ft. interval 2-in. foundation drain pipes connected to deep drill holes in the foundation rock; welding the 5-in. contraction joint drain pipes, located every 50 ft., to previous drains extending to the top of the dam. The vertical grout pipes, of which there were 18,000 linear feet, were also welded, pipe lengths of about 20 ft. being butt welded together.

Slotting Grout Pipes

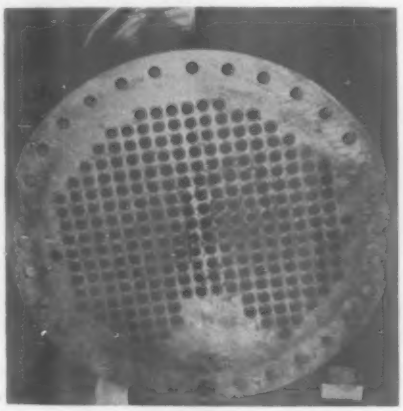
The grout pipes mentioned were slotted as shown in Fig. 6, and it was through these slots that the grout for the Prepakt aggregates was forced under pressure. The slots, each ¼ in. wide by 6 in. long, were cut on opposite sides of the vertical pipe on 30-in. spacings. The slotting was done with a two-torch portable flame-cutting machine following a slotted template (Fig. 7).

Another interesting application of welding on this project was in connection with the trash racks in front of the 30-in. diameter service gates (above in Fig. 8) and the 4 by 4 ft. sluice gate (below in same picture).

* * *

Silicon Bronze Welded to Mild Steel

BY H. HOSE
Welding Engineer, Ampco Metal, Inc.



TUBE SHEET HEADER for large condenser for chemical processing

WELDS JOINING silicon-bronze tube sheets to mild-steel shell

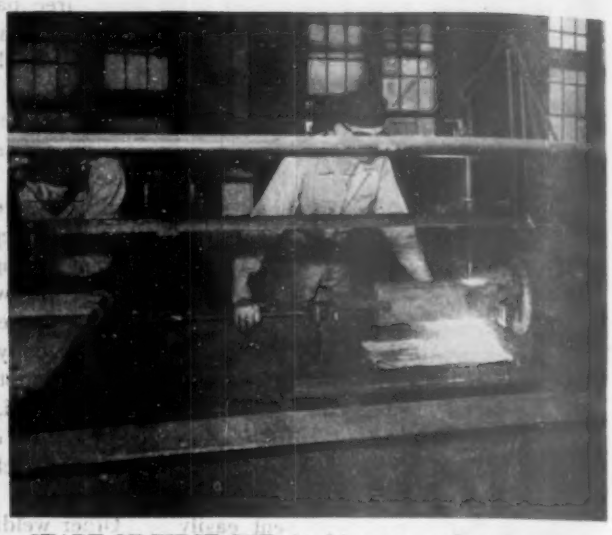
COPPER-silicon alloys are used extensively in the fabrication of chemical processing equipment, pressure vessels and condensers. These silicon bronzes, because of their inherent hot-short characteristics, have always been difficult to arc weld by the metal-arc process. The accepted method was to use the carbon-arc torch with silicon-bronze bare rods. Recently, however, a faster method has been found—use of coated aluminum-bronze electrodes.

An excellent example of how aluminum-bronze electrodes are employed in the welding of dissimilar metals is provided by a large condenser constructed by the Vulcan Copper and Supply Co., Cincinnati. The tube sheets were made of Everdur 1010 silicon-bronze plate and welded to the A-70 mild-steel shell with 5/32 in. aluminum-bronze electrodes having a tensile strength of 60,000 to 70,000 psi. Reversed polarity direct current at 160 amp was employed, and the assembly was positioned for downhand welding.

A recommended procedure for joint construction was followed. The steel wall was chamfered on the outside to a 60-deg. bevel with a ⅛-in. lip. Approximately ⅛-in. root opening was maintained between the tube sheet and the mild-steel shell in order to obtain complete penetration. Two layers of aluminum bronze were deposited to complete the fillet weld on the outside of the vessel. The welds were then back chipped on the inside down to solid deposit. A single fillet weld deposited on the backside completed the welded joint.

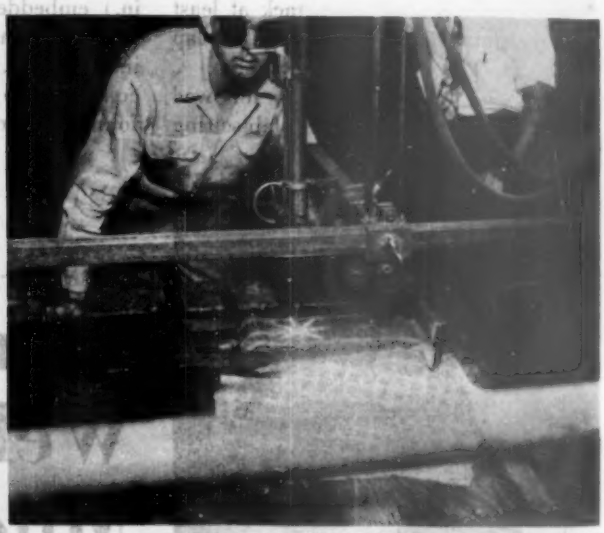
Preheating was not required because of the low thermal conductivity of silicon bronze. It is good welding practice, however, to avoid overheating this alloy. No cracking was encountered, even in this exacting application where silicon bronze was welded to steel. Every joint was tested hydrostatically upon completion and not even a single leak developed.

PAPER TEMPLATE is traced by Operator Owen Higgins. Foreman James Leonard checks alignment, lights torch



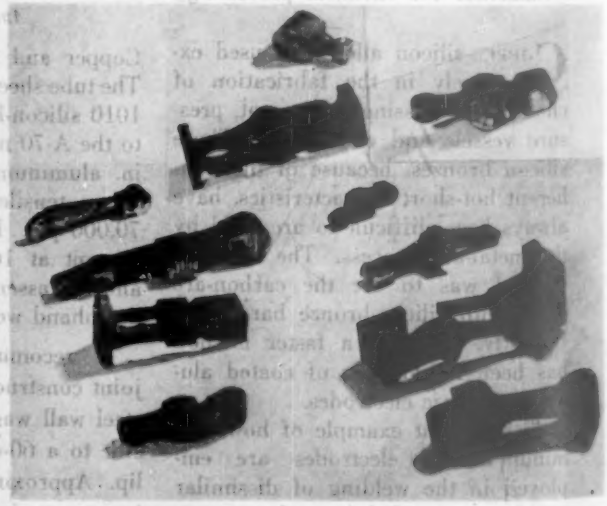
START OF FIRST CUT. At this stage, only one operator is required. Outline of first view is shape-cut

FIRST CUT COMPLETED. Engineering department maintains close liaison with shop in Bliss organization



WORK IS ROTATED 90 deg. before starting second cut. Speed is increased to compensate for reduced thickness

FINISHED PART or "burnment" was cut in about 9 minutes for both cuts. Set-up time was around 20 minutes



FLAME-CUT PARTS above will replace two steel forgings, two steel castings and four gray-iron castings

Three-Dimensional Flame-Cutting

Intricate shapes can be cut in one piece by first cutting the plan view, rotating the part 90 degrees and then cutting the elevation. These "burnments" are replacing numerous items formerly forged or cast

BY O. L. BAILEY
Assistant, Welding Engineer,
E. W. Bliss Co., Detroit

MANUFACTURE of machinery, especially automatic machinery, calls for numerous irregularly shaped parts which are most efficiently produced by oxyacetylene shape-cutting. The shape-cutting machine is essential for any machinery factory, yet few, if any, manufacturers are making full use of this versatile tool.

The intricate shapes of many castings, weldments or forgings preclude at first glance any thought of their being produced by shape-cutting. Further inspection of such parts, however, will reveal more often than not that profiles in two views will outline the essential shape of the product.

Plan View and Elevation

Basically, the process consists of cutting the shape of one view out of a plate of sufficient thickness to include the other view in the same dimension. The piece is then rotated on a predetermined axis to proper position for cutting a profile of the second view. In most cases, the axis will be longitudinal, the rotation will be 90 deg. and only one cut will be necessary to trace either the plan view or the elevation.

So far, little or no effort has been made to redesign parts to utilize this process, but its value for creating new parts or emergency replacement of old ones is readily recognized. Reasons for instituting the process might run approximately along these lines:

A new part is designed and pattern costs are found excessive. An old pattern is lost, destroyed or requires expensive alteration due to engineering changes. Usual sources are unable to make delivery of a part within the time required. Under these and similar circumstances, the requirements are submitted to the welding engineer, who determines whether the part should be flame-cut as a unit or fabricated of component parts. The size of the part need be limited only by the capacity of available equipment.

For emergency delivery of one-of-a-kind pieces, a tracing pattern can be made by a shop template maker after a few minutes' instruction. Where future duplication is anticipated, greater efficiency may be attained by incorporating a sketch of the cutting template into the engineering record, thus informing all concerned of a new source for this and similar parts. If a full-scale blueprint is supplied the shop, the profiles can be traced directly from it and no template work will be necessary.

In addition to standard shape-cutting equipment with a manual tracing head for cutting directly from sketches, it is necessary to have a positioning jig for holding the workpiece so that it can be rotated on an axis fixed parallel to the centerline on the template. During the actual cutting operation, an auxiliary operator may be required.

Close Cooperation Needed

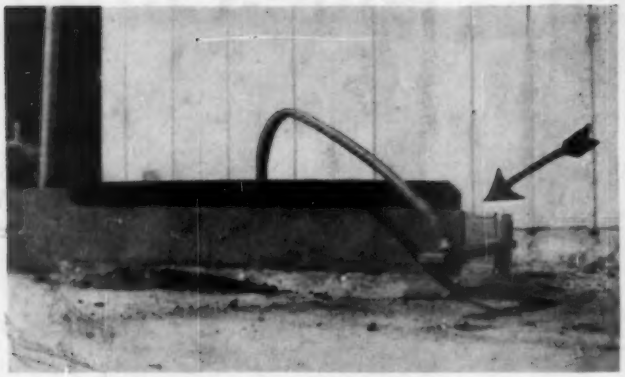
The draftsman or template maker first determines the size of stock needed to encompass the extreme limits of the finished piece and adds sufficient surplus to allow the work to be clamped. The next step is to determine which profile it is best to cut first. This profile and its centerline must then be superimposed on the corresponding view of the plate stock. Next arises the problem of rotation. If the product is not symmetrical at all sections, the direction of rotation must be carefully determined as this step may reverse the irregularity of the finished pieces. No such difficulty can arise if the product is symmetrical or made in opposing pairs, but directions as to rotation must be understood to be an essential part of the template.

Symbol for Second Cut

When the draftsman has envisioned the piece as correctly turned, he superimposes the new view and centerline on the other two. This view represents the operator's second cut and should be distinguished by either a dotted line or a line of different color. Operator and draftsmen should reach an understanding as to which is to make allowance for the kerf; the finished piece will be smaller on all sides by half the width of the kerf. They should also determine in advance whether the metal removed on the first cut is to show on the template or to be left up to the operator. After the first view profile is cut, some stock must be left at each end to hold the work for turning it into position for the second cut. Unless the drafting and cutting departments are in fairly close touch, this information should also appear on the sketch.

Positioning equipment can be readily made from scrap parts of an old lathe; actually, all that are required are two rigid centers, one capable of adjustment. Indexing stops, especially at 90 deg. in each direction, are very convenient. Also convenient but more expensive is a device like a lathe chuck which clamps the work by one end. Provision must be made, of course, for aligning this type of jig with the axis of the pattern.

Besides providing a ready and economical source for unusual items, this new cutting process has the attractive feature of operating in most cases entirely on scrap material.

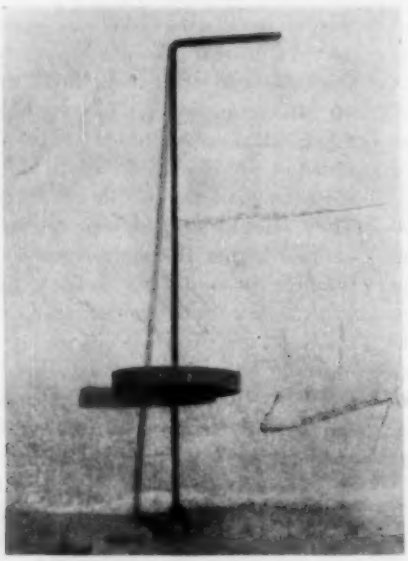


1—OLD DESIGN of ditching vee. Arrow shows hitch

2—NEW DESIGN pulls nose of vee into the ground

Farm Equipment Remade

Ernest Koop repairs broken farm machinery and also specializes in the design of new equipment that will meet the special needs of his agricultural customers. Here are several good specific examples



5—VALVE WRENCH for pipe line

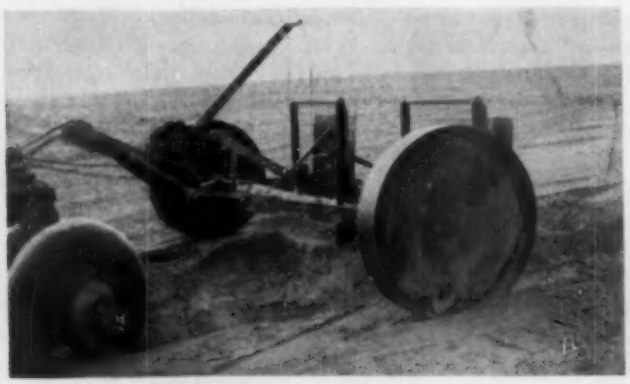
BY ERNEST J. KOOP
Koop Blacksmith & Welding Shop, Bakersfield, Calif.

WERE I to go to another part of the United States and start a welding job shop for farm implements similar to the one I now have, I would first spend a week on a good-will and statistics tour through that part of the country where my new shop was to be located. This would give me the opportunity to meet the farmer on his own grounds, to discuss his problems and look over his machinery. I would keep my eyes and ears open because one would be surprised how much a farmer can help the shop man to design or redesign a farm implement to do a job better.

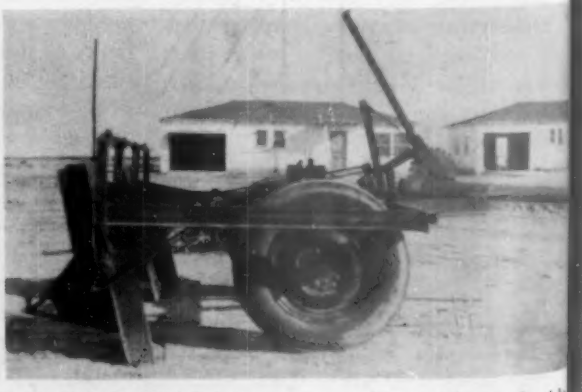
As an example, Fig. 1 shows a ditching vee used for making irrigation ditches. The hitch was too low and kept gathering up weeds and trash, finally choking up the point of the cutter blade (see arrow). The channel skid irons also blocked over half of the point's efficiency to dig

IMPROVED DITCHING VEE

Fig. 2 is a ditching vee of new design. The cutter blade point is allowed to extend past the skid irons by one inch. The hitch iron or continuation of the skid iron is made from a flat bar, 5/8 by 2½ in. Use of a narrow but thicker bar for the hitch gave the point of the vee an unobstructed edge where it was most

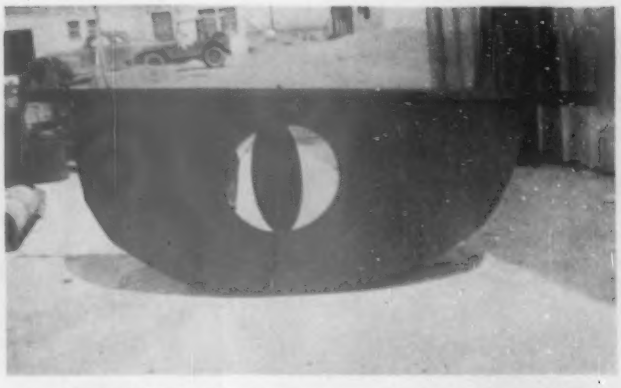


6—OLD STYLE OF RIDGE or border damming machine



7—MORE COMPACT damming machine of lowered weight

3—DITCH TAMPON with gate of conventional design



4—NEW GATE of the tampon swivels instead of slides

needed, just above the top of the ground. A slight raise of the hitch iron gives added point clearance and pulls the nose of the vee down into the ground.

With the redesigned equipment, it is often unnecessary to plow a ditch before veeing it out as the entire job can be done in one operation.

Ditch Tampon Gate

Fig. 3 is a picture of a mechanical dam or ditch tampon used for the control of water in an open irrigation ditch. When the slide irons and gates become battered and bent through usage, it is very hard to get an accurate adjustment on the amount of water to be let on through the gate spillway. The redesign shown in Fig. 4 is proving out well. By cutting an 18-in. hole through the center of the tampon and using the cutout disc as the gate, the slide irons of former design were eliminated. Pipe slipped over a round bar serves as the gate swivel. The upper pipe has a 3/8-in. hole drilled in it, and a 5/16-in. nut welded over the hole. A setscrew is turned into the nut and tightened down on the round bar to hold the gate at any desired opening.

Fig. 5 is a new version of an old and familiar tool, the pipe line valve wrench. The iron band serves as a guide for the valve tightener prongs when wrench is lowered down into the valve pot.

The machine shown in Fig. 6 is used to deposit dirt dams on each side of a ridge or border, and it can also be used to deposit dams inside a furrow or ditch. Two dirt scoopers are mounted separately from each other on an axle in back of the wheels. The scoopers are held in a vertical position by iron prongs which extend forward and rest on a trip iron. When the trips are pulled, the scoopers turn over and deposit the dirt they have gathered, and this action brings the other halves of the scooper blade into position to complete the cycle. The trip irons and scooper blades are made from mild steel and hard-faced with an impact-and-abrasion-resistant rod.

Fig. 7 is a more compact design of greatly lowered weight.

Small Planter Sled

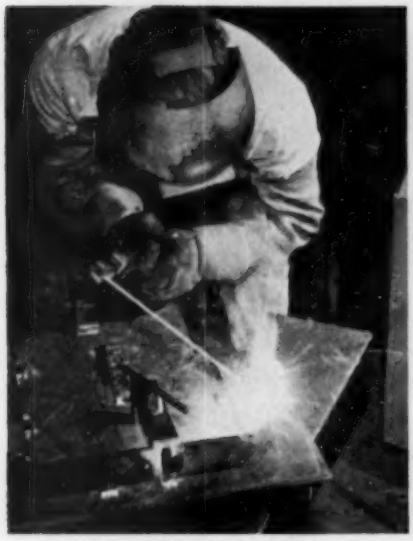
Small planters are clustered in squadrons for such crops as sugar beets, carrots, flax or other crops in which two or more seed rows are desired on one bed. The planters can be mounted inside a bed-shaping device such as Fig. 8. Mild steel was used throughout its construction, including the runners. The runners were hard-faced for the entire runner length with an abrasion-resistant deposit laid in stripes 1½-in. apart.

The tractor cab shown in Fig. 9 may be fabricated from most any shaped steel. One-inch standard pipe is preferred for the uprights. The cab is held in place on the tractor by four brackets made from 1¼-in. standard pipe welded onto a ⅜-in. plate. The ⅜-in. plate is drilled with holes to fit the holes on the tractor fender braces. The brackets are bolted down, and the cab uprights slip into the 1¼-in. pipe. The slip joints obtained by using two different sizes of pipe for the upright holders help to reduce the vibration and shock of the tractor in motion. The cab is easily removed by lifting it straight up out of the holder brackets. Canvas is stretched over the top for protection from the sun or rain. For winter work, canvas may be stretched from the radiator to

(Continued on page 64)

8—PLANTER SLED mounts squadron of small planters

9—TRACTOR CAB framework fabricated from piping



BASE SUBASSEMBLY. The frame ring halves are positioned in a holding fixture for arc welding

FRAME SUBASSEMBLY. Four capacitor brackets are spot welded to one of the upright channels

CASE PANELS are held together by C-clamps and spot-welded. The welds are spaced on 6-in. centers

Welders on th

To meet modern demands for modern welding equipment, Westinghouse Electric Corporation is producing arc welders on a mass-production basis

BY T. B. JEFFERSON

A TRIP to the new Westinghouse welder plant at Buffalo discloses that a-c arc welders are now being produced on an assembly line. The new Westinghouse welders have been designed around a group of five subassemblies: base, frame, case, reactor and transformer. Each of these is fed into a moving line similar to that found in a motor car manufacturing plant. As the base is started down the conveyor system, the frame, case, reactor and transformer are gradually added until the completed unit finally comes to a test bench. After testing, the crate is added and the unit is ready for shipment.

TESTING WELDER for no-load exciting current, no-load watt loss, etc. Welding current indicator dial is adjusted under varying load conditions

BUILDING THE BASE

Welding processes play an important part in the building of this new welder. Welding first comes into play on the base, which is made up of two frame ring halves, two angle-iron supports, four skid or swivel wheel nuts and one screen. The first welding operation is to join the frame ring halves, which are positioned in a holding fixture. Tack welds are made at each end, using 3/16-in. E-6012 electrodes. The four skid nuts are positioned in the fixture and welded to the frame ring corners. The angle-iron supports are then positioned and welded to the frame ring sides. The unit is now sufficiently rigid to be removed from its fixture so that finished welds may be made at each end of the frame ring.

The frame consists of two upright channels, a bottom cross channel, two center cross channels, a top cross channel, two angle-iron feet, four capacitor mounting brackets and two terminal board brackets. First, one of the upright channel members, the

TRANSFORMER is positioned in frame and held by cross-channel member fastened to frame uprights

PARTIALLY WOUND reactor coil. Faceplate or flange was removed to show how the turns are wound

REACTOR coil and core are held in the frame by top cross-channel and another cross-channel member

the Assembly Line

four capacitor brackets and one terminal board bracket are positioned in a holding fixture so that the brackets may be spot welded to the upright channel. The matching upright channel and the other terminal bracket are similarly positioned and joined by spot welding. These two fabricated upright channels are then positioned for joining them by arc welding to the bottom cross channel member. This latter welding is also done with 3/16-in. E-6012 electrodes. A similar type of electrode is used to weld the two angle-iron feet to the cross channel members after the components have been properly aligned in a jig.

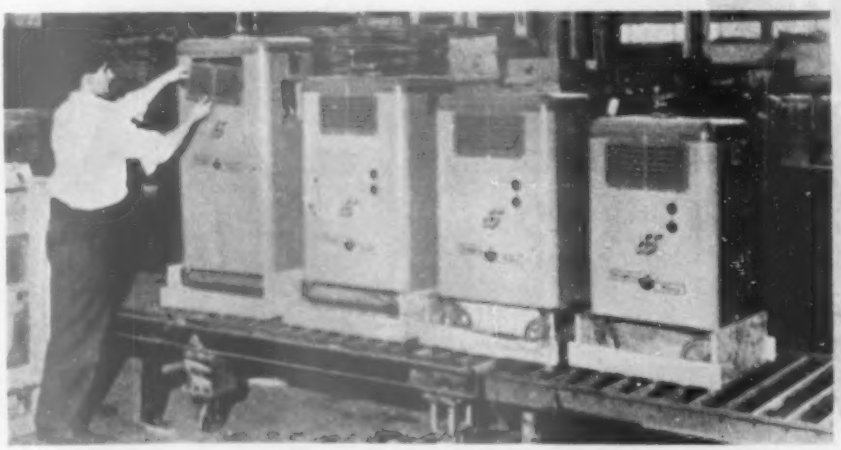
Case Projection Welded

The case is fabricated from 16-gauge hot-rolled, pickled and oiled sheets. It consists of a front, rear and two side panels. The size of the panels varies according to the size (rating) of the a-c welder on which they are to be installed. After the various panels have been formed so they will assume the general shape of the welder, six 1/4-in. nuts are projection welded to them. These nuts are for the screws that hold the louvers in hand holes of the front and rear panels. A special jig is used to align the nuts with the 9/32-in. holes. The projection welding, like all spot welding, is done by resistance welders sequenced by electronic controls.

The case is now ready for assembly. The offsets in the side panels are used to position the front and rear panels when they are joined by spot welding. Quick acting C-clamps hold the panels in place during the welding. The welds are spaced on 6-in. centers.

While these subassemblies are being built, the reactor and transformer are being built and fed towards the production line. Final assembly is now accomplished quite easily (see pictures).

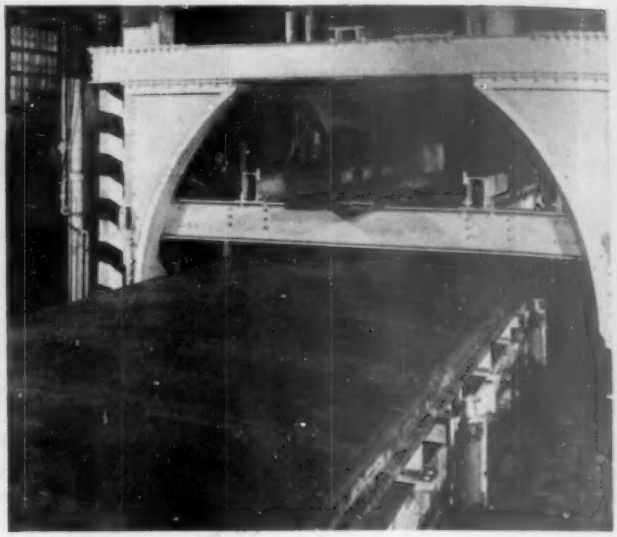
CASE AND COVER go over the assembled chassis. Hand crank will be added on top to raise or lower the core of the adjustable reactor



PALLETS on which finished welders rest also serve as bottoms of shipping crates. From left to right, ratings are 500, 400, 300 and 200 amperes

Roof

8—ROOF FRAME is assembled in pneumatic jig to assure correct alignment of frame and roof supports



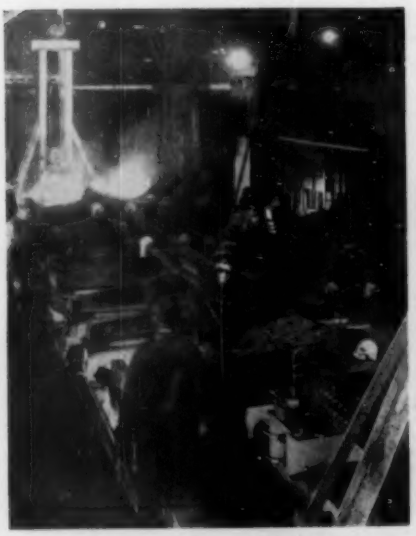
9—ROOF SHEETS are welded by automatic heads to roof framing. Welding heads follow rounded contours

ALL-WELDED Refrigerator

Roof, sides and underframe are of welded construction in newest type of ACF refrigerator cars, now being turned out in quantity lots to solve the problem of conveying perishable food to market at passenger-train speed

BY JOHN H. GIROUX

Underframe



1—UNDERFRAME ASSEMBLY is locked upside down and pneumatically clamped in jig for welding

2—ROTATING underframe for downhand welding of edge welds. Big rotator turns the entire frame

3—WITH TRUCK added to underframe, smaller parts are hand welded. Slag is removed by grinding

Sides

4—SIDE FRAME POSTS, sill and top plates must be joined together before side sheets can be added. The fixture shown above holds an entire car side

5—GANTRY-MOUNTED head joins side sheets to ribs of the frame

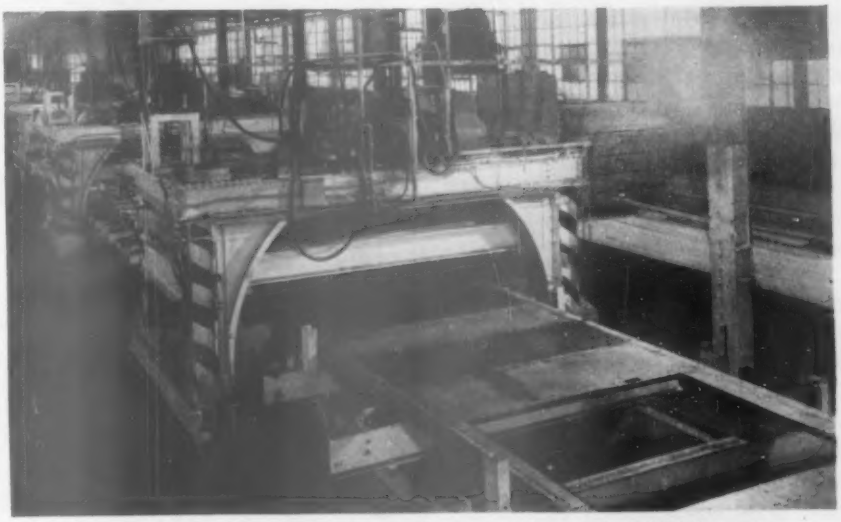
Cars

IF THE next time you're waiting at a railroad crossing for a crack passenger train to pass and you see a freight car with a wide green band at window level preceding the coaches, don't be amazed — it's the new "Hundred-Mile-an-Hour" all-welded refrigerator car of Railway Express Agency. These cars are coming into fashion for the delivery of vegetables, fruits, sea food or other perishables at streamliner speeds.

As evidence of their popularity, American Car & Foundry Co. has an order from Railway Express for 500 refrigerator cars, Atlantic Coast Line Railroad has requested another 50. At present the ACF Chicago plant is the only one making such cars.

Built of high-tensile, low-alloy steel, these high-speed cars are of welded construction on underframe, sides, roof, floor and ends. There are a total of 1,475 ft. of welded seams per car, of which about 800 ft. are submerged-melt welded and the balance manually arc welded.

The builder has adopted roller bearings, trucks and brakes of full passenger-car standard. Wheels are heat-treated wrought steel, and axles and other truck components have

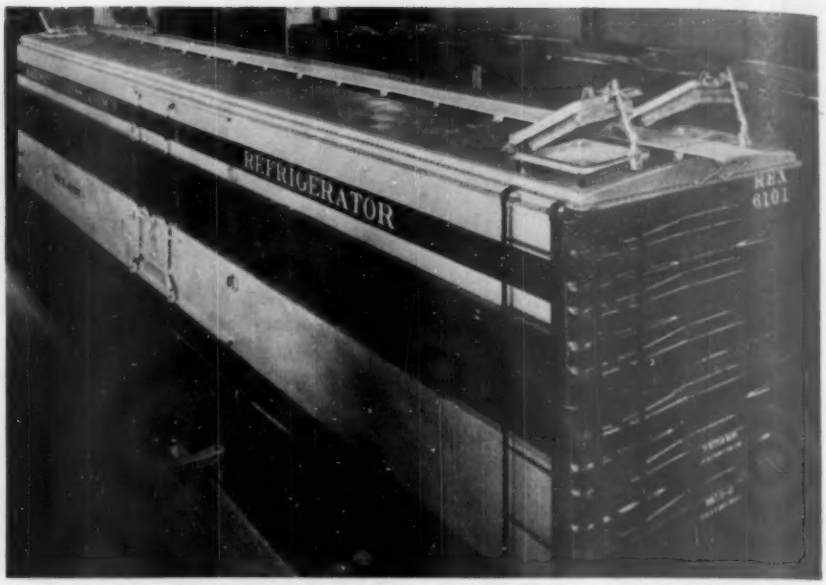


6—SIDE LEAVES welding jig. Disc sanders smooth occasional high spots

7—STUDS FOR INSULATION mounting are welded to inner sides of ribs

been subjected to magnetic-particle inspection to detect incipient flaws.

Production has been accelerated by the installation of an assembly line based on latest improved methods of manufacture. To automatic submerged-melt welding heads have been added the use of pneumatic jigs and frames capable of holding an entire car roof or side during welding. If manual arc welding is necessary, the entire assembly can be rotated to enable weldors to work in the downhand position. Complete assembly line can be adjusted for whatever type or size car is desired. A by-product of this technique is the assurance of greater employee safety through the use of additional protective devices.



10—FINISHED REFRIGERATOR CAR with ends and roof fittings, including welded central running board. Color scheme gives window effect

Underframe Construction

Production begins with the underframe, parts of which are locked upside down in a pneumatic jig preparatory to arc welding. By placing the work in this position, downhand welding may be performed throughout the assembly, Fig. 1. The center sill, which runs the entire length of the car, has a 7/16-in. web and a ¾-in. flange. Both of these are veed out and joined by fillet welds, penetration being about 30%.

Welding of the topside, the next step, is carried on at another station. An overhead crane removes the underframe from the jig and, after it has been turned over, places it right side up on dollies. These carry it to what is called a rotator (Fig. 2), a large fixture that permits the underframe to be automatically turned on its side to receive edge welds. It is then permanently trucked (Fig. 3), and scale and slag are removed. Miscellaneous parts are added following the final welding of the center sill.

Side Assembly

Before side sheets can be joined to form the walls of the car, posts, sill and top plates must be made an integral part of the side frame. This job is performed on a side welding jig. Special attention is directed toward pneumatic clamping to avoid distortion during welding (Fig. 4). Side sheets are then added to the frame while the entire assembly remains in the jig.

An assembly line makes this a continuous operation. Frames and ribs are placed with their outside up in order to receive the steel side sheets. The sheets vary in width from 15 to 31 in. After they have been placed on the frames, weldors and helpers tack weld the sheets at top and bottom. This positioning assures good joints when the finish welds are made.

Several submerged-melt heads are in continuous operation for the welding of side sheets. These heads are mounted on cross gantries straddling the assembly lines. As the tack-welded sheets move into a welding station, hold-down fingers within the gantry clamp down on two sections to aid in making a good weld to the post or sill. Fig. 5 gives an excellent view of this step.

This submerged-arc process uses direct current with a bare electrode fed through a granular flux. Sufficient flux is applied to blanket the arc and molten metal—unfused flux is reclaimed for further use. Extremely high currents may be used; a ⅛-in. electrode, for example, may carry as much as 650 amp. The high current results in greater penetration and permits smaller cross-sections of weld metal, with resultant savings in cost and reduced warpage and distortion.

Welds on low-alloy, high-tensile steel are said to give a minimum yield point of 50,000 psi, a minimum tensile strength of 70,000 psi and 22% minimum elongation.

Gantries are arranged to move transversely and longitudinally so that a complete side may be welded at a time, including the top and bottom longitudinal welds. As the integral side leaves the welding station (Fig. 6), all joints are inspected and a disc sander is used to smooth occasional high spots.

Studs for Insulation

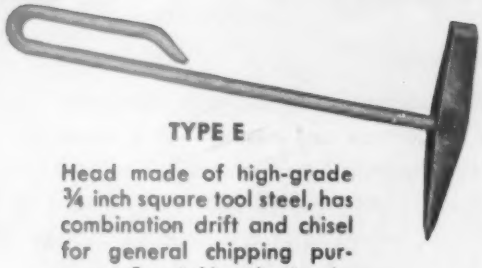
The side is then turned over (performed while the line is moving) so that the frame is exposed. Insulation is a vital necessity in every refrigerator car, and there must be some means to permit its installation. The answer is found by welding studs to the side ribs. One man or sometimes two men mark the ribs with a punch to indicate where the studs are to be welded. The punch is guided by holes in a wooden template having the same dimensions as the holes in the wood nailers. As additional assurance, a chalk mark further identifies each specified point where studs are to be welded. A porcelain ferrule is preplaced at each predetermined marking to surround the stud and prevent oxidation while it is at welding heat. Five studs are affixed to each rib, using the gun shown in Fig. 7.

As the side moves further along the line, the wooden framing containing the insulation is added. Insulation consists of fiber glass placed behind a wide dead-air space from which incoming heat is reflected by

USE CMD HAMMERS FOR *Every* WELD CLEANING NEED!

TYPE A

Drift and Chisel. Made from high-grade tool steel. Popular in malleable iron and grey iron foundries for general chipping.

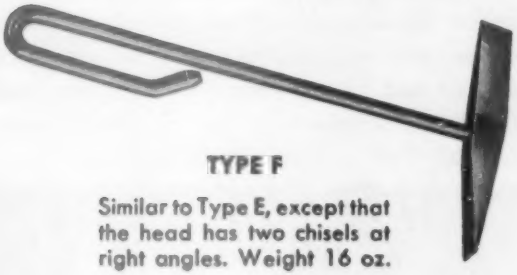


TYPE E

Head made of high-grade ¾ inch square tool steel, has combination drift and chisel for general chipping purposes. Special hand grip absorbs shock. Weight 16 oz.

TYPE CB

Triple Duty. Combines 3 tools in 1—drift, chisel, and removable wire brush.

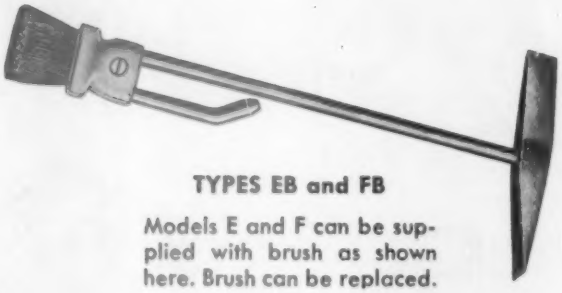


TYPE F

Similar to Type E, except that the head has two chisels at right angles. Weight 16 oz.

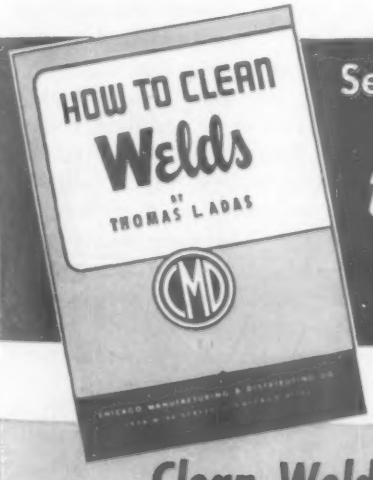
TYPE C

Drift and Chisel. Same as Type CB but without brush.



TYPES EB and FB

Models E and F can be supplied with brush as shown here. Brush can be replaced.



Send For This **FREE BOOKLET** TODAY!

Authentic information for experienced and apprentice weldors.

Order CMD Hammers from your local welding supply house.

Chicago Manufacturing & Distributing Co.
1928 West 46th Street, Chicago 9, Ill.

Please send without obligation _____ copies of the booklet "How to Clean Welds."

NAME.....

FIRM NAME.....

ADDRESS.....

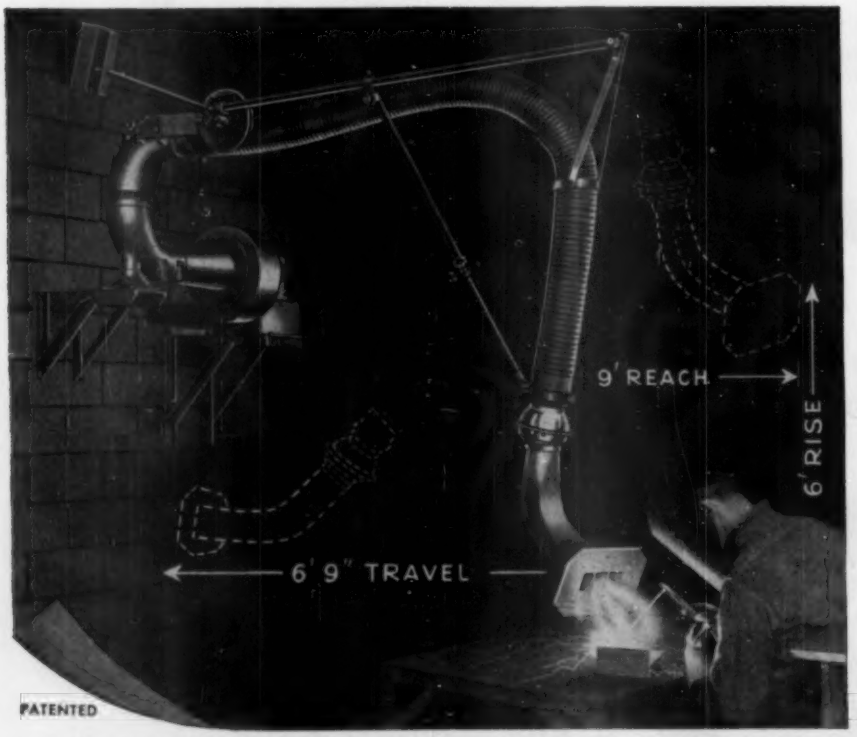
CITY.....ZONE.....STATE.....

Clean Welds Mean Sound Welds — Lasting Satisfaction

"I WORK IN CLEAN FUME-FREE AIR
—thanks to our
RUEMELIN
FUME COLLECTOR"

Welding shops equipped with Ruemelin Fume Collectors are assured of a clean shop atmosphere. Noxious fumes, heat and smoke are eliminated *at their source*, thus improving working conditions, lessening fatigue and paving the way for increased plant production.

The Ruemelin Fume Collector hood can be instantly placed where needed anywhere in the booth welding area. No tedious adjustments necessary. Just pull the inlet hood to the welding position and you are ready to go. Approved by state industrial commissions and by compensation insurance companies. Simple to install. Thousands in service. Many users send in repeat orders. Write for bulletin 37-C today.



Standard Model D-5310 with hood reaching out 9 feet from wall. Also available in Long Reach Model D-5342 with hood reaching out 15 feet from wall.

RUEMELIN MFG. CO.

3880 NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.

MANUFACTURERS AND ENGINEERS • SAND BLAST AND DUST COLLECTING EQUIPMENT • WELDING FUME COLLECTORS

a reflective surface. With its insulation added, the side is complete and ready to be applied to the underframe.

Roof Assembly

While the sides are in the production stage so, too, is the roof. Its steel top is welded to supports in much the same manner as the side sheets are welded. Roof frame members are first assembled in a large fixture (Fig. 8) and clamped pneumatically for automatic welding. Welding heads are arranged to follow the rounded contours in adding the top sheets to the roof framing (Fig. 9). Both transverse and longitudinal seams are welded automatically.

On top of the roof are provided a central running board, ice bunkers and hatchways (Fig. 10). Arc welding again comes into play for installation of these fittings. Steel plates are fillet welded to the roof, and the hatch doors and running board are bolted to them.

Floor and ends are assembled before the roof is joined to the sides of the car. The ends are bolted in place and then riveted. It might be well to mention that the ends are deeply corrugated for additional strength.

Riveting joins the roof to the ends and sides of the car—portable furnaces and rivet squeezers are used. The floor is both waterproofed and insulated—the roof insulated.

Upon completion of assembly, the refrigerator car receives a prime coat of paint. Inspection of all outside welds follows. The cars are painted green and aluminum—colors breaking at lines that give a window effect along the sides (see Fig. 10).

Among the many innovations of the new carrier is a sliding door, a marked departure from the conventional hinged door, which facilitates loading or unloading at platforms of any height. The door works on a pivot, and has only to swing out a distance of its own thickness in order to open. Beveled strips at the vertical edges lock against the door jambs and resist lateral pressure.

Overall length of the car is 51 ft. 10 in. and weight about 79,200 lb. Normal capacity of a car is 50 tons, allowing a payload of approximately 62,000 lb. at speeds of 100 mph.

Precision Repairs

For Precision Equipment

Oxweld
PREST-O-WELD
PUROX

Oxy-acetylene equipment made by Linde doesn't ask to be "babied" but regular maintenance is the key to trouble-free operation of all mechanical equipment—oxy-acetylene equipment included. It never pays to postpone its care or do a halfway job. Welding and cutting apparatus in need of repair is wasteful of gases and time. It may also create a fire hazard in your shop. If your equipment has been improperly operated or carelessly handled, it may need repairs that cannot be made in your shop without special tools.

Take advantage of Linde repair service and be assured of a factory-quality job—get a complete overhaul, genuine parts, skilled workmanship, and expert inspection and testing at minimum cost. This service is as near as your Linde office or it is available through your jobber, who will gladly forward your apparatus to the nearest of Linde's more than 30 factory-supervised repair stations.

The words "Oxweld," "Prest-O-Weld," and "Purox" are registered trade-marks.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd St., New York, N. Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

An Offer

THAT MAY ENABLE YOU TO EFFECT IMPORTANT WELDING CARBON SAVINGS

On many of today's exacting welding operations, relatively high current values are required for the diameter of the electrode which must be used. For the increasingly large number of jobs in this category, Stackpole COPPER COATED welding electrodes are the answer.

As compared with uncoated types, *Copper Coated* welding rods increase current carrying capacity, provide better contact between holder and electrode, reduce the amount of tapering necessary, last longer, and produce better welds.

Our offer, then, is simply this: Let us send you free samples of these unique *Copper Coated* rods. Test them under actual working conditions. Note their superiority—*not* as proved by mere claims but by on-the-job operation. Tell us the details of your welding operations. We'll send the proper rods for test. You be the judge!

WELDING or BRAZING CARBON ELECTRODES that last 3 to 4 times as long!

Stackpole's recently developed "F" treatment for Carbon Brazing Tips produces units that operate at temperatures above red heat, reduce dressing time by as much as two-thirds and increase life up to 5 times that of untreated carbon by minimizing oxidation.

On a typical high temperature job where ordinary carbons were changed hourly, Stackpole "F" treated carbons lasted all day and required dressing only about one third as often. Three to four times longer life is an extremely conservative estimate. WRITE FOR SAMPLES. State size and shape required. Mention company connection.

UNTREATED after 500 brazing operations

STACKPOLE "F" TREATED after 1300 similar operations

STACKPOLE

EVERYTHING IN CARBON BUT DIAMONDS

STACKPOLE CARBON CO.

ST. MARYS, PA.

FARM EQUIPMENT REMADE

(Continued from page 55)

the rear upright to bring the warmth of the engine back to the operator.

Welding Cast Iron

Many farm implements are loaded with cast-iron parts. Some of the castings can be conveniently welded or brazed by the oxy-acetylene method, but others are of such size and shape that the smaller shop lacks the preheating and cooling equipment required to handle them.

Why not try arc welding?

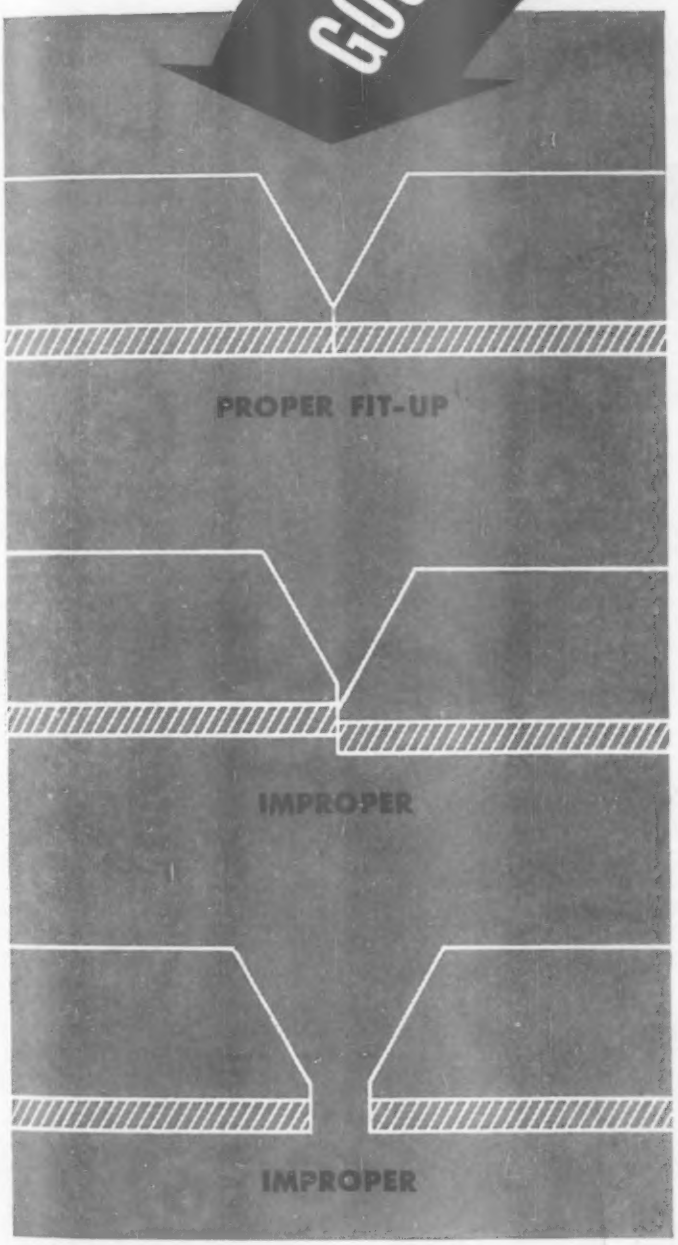
A good deal of eyebrow lifting is still done by doubting Thomases about arc welding motor blocks and heads. I'll stick my neck out, however, and say that most of the arc-weld failures on iron castings can be traced back to an operator fault. Preparing the work for welding is of the utmost importance. Grindings, filings or other matter in the path of the arc may cause it to deflect for an instant or pick up the foreign material in the weld metal.

Cracks in motor blocks are usually soaked full of oil. The heat of the arc causes the oil to rise to the surface. The result is porosity and spewing of the arc. The molten metal, being blocked by an oil film, is unable to penetrate the parent metal. Oil sludge found on the inside walls of motor blocks has been the cause of fusion line cracks since it has served as an unwanted quench on the parent metal.

Peening of the weld should start from where the weld was begun, and continue up to the stopping point. The excellent electrodes for cast-iron arc welding on the market today will withstand contraction of cooling metal much better than the rods used several years back. But it is still necessary to peen the weld metal through that critical contraction range. The manufacturers of cast-iron welding electrodes have spent many hours trying to overcome the same problems that we encounter. Let's not forget our share of the procedure. If we fall down on only one phase of the procedure, we can expect a bad weld.

We can not please all of our customers, but we can try and as long as we try we will always have a business.

GOOD FIT-UP IS Necessary



In welding clad steels, accurate alignment and fit-up of edges to be welded is an important step following preparation of plate edges. Care in this operation simplifies the welding work. It is then easier to make a joint having high structural strength and preserving the integrity of the corrosion-resistant clad surface.

After establishing the alignment of the clad edges, tack-weld on the steel side to hold it there. Use any good grade of carbon steel electrodes. Then lay down the root bead on the steel side, taking care not to penetrate the cladding.

Complete the weld on the steel side and then chip it back from the clad side until sound weld metal is uncovered. Finally, fill this in with rod matching the cladding. You will have an unbroken corrosion-resistant surface, providing the protection for which the Lukens Clad Steel was selected.

Clad steels are readily welded if the joint is properly designed and the correct procedure followed. For data on both, write Lukens Steel Company, 416 Lukens Building, Coatesville, Pennsylvania.

CLAD METAL STEEL

LUKENS

Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad
STEELS

SOLID METAL ADVANTAGES WITH CLAD STEEL ECONOMY

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

Are You A Postage Saver?

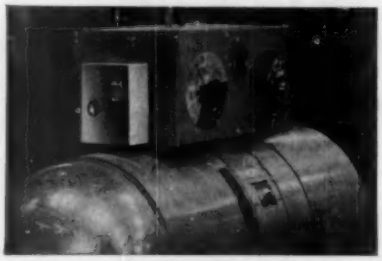
One Idle-Running Welder Can Cost You More Than 250 3¢ Stamps Each Month!

IT'S A FACT... The cost of the power *wasted* by one idle-running 300 or 400 ampere d.c. welder would pay for 250 three-cent stamps each month! Tests show that welders *run idle 50 to 95% of the time!*

Power is not the only item you waste. Your welder's service life is slipping away, too — all the time it's running. Idling motors drag down your power factor, disturb power loading. It all adds to your operating cost — needlessly.

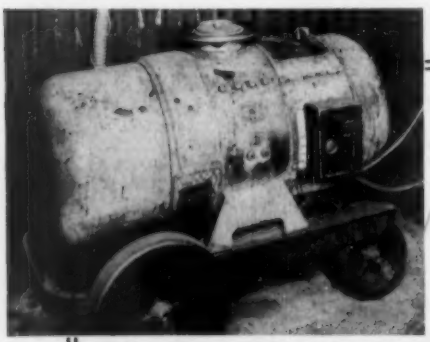
Needlessly, because now there's a reliable means of *automatically* starting your welder when it's needed and stopping it when welding ceases. The answer is the DV Automatic Start-Stop Welder Control. Job-tested DV controls start the welder the moment the electrode contacts the work piece, and automatically shut down the welder 1 or 2 minutes after welding stops. The time delay (adjustable) keeps the set running while the operator changes electrodes, positions his work, etc.

The average number of starts with DV controls is but 15 per 8-hour shift, yet the savings in reduced idle time have—on hundreds of installations—paid the entire cost of DV controls in less than a year!



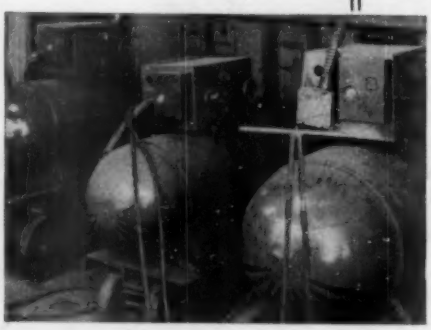
An accurate arc time totalizer (optional) records actual welding time in minutes. Production and cost data can easily be obtained without the bother of measuring weld footage or weighing rod.

DV controls are easily installed on any electric-driven d.c. welder equipped with magnetic starter. They do not interfere with the regular welder controls, nor with the operator's usual welding technique.



Longer Service Life with less maintenance results when idle running time is reduced; that's why International Sales Company equipped their machines with DV Controls.

Improved Power Factor was another advantage gained when this modern plant installed DV Controls on all welders (idle-running welders have very low power factor). Photo taken at the San Francisco plant of Gar Wood Industries, Inc.



START SAVING NOW... Write or wire us today for literature and prices...

D-V WELDING CONTROLS

3959 PIEDMONT AVENUE • OAKLAND, CALIFORNIA

High-Frequency Preheating Helps Weld Turbo

HIGH-FREQUENCY heating prior to arc welding saved several days in the repair of the fractured shaft of a 25,000-kw. turbo-alternator located at Bunnerong, Australia's largest power station (325,000 kw.). The shaft was preheated to 500 F. preparatory to welding.

The break occurred about 24 in. from the steam inlet and at a point where the tapering shaft measured 4½ in. in diameter, according to the bulletin of the Sydney County Council, *The Contractor*. The broken end was machined off square, increasing the diameter to 5 in. This end and the end of the stub were then flame-cut for a double-U joint and ground smooth. After the shafting had been properly aligned, the first application of high-frequency heating was made.

An induction heater with 20-kw. output and operating at 450 kilocycles per second was used for preheating the shaft. Its circuit includes two water-cooled oscillator tubes with high voltage provided by twelve mercury-vapor rectifier tubes. At full power output, the high-frequency current in the work coil approximates 150 amp. root mean square.

A work coil consisting of a few water-cooled turns was wound over the shaft about 6 in. from both sides of the fracture. Rapid heating was obtained by adjusting the initial output of the generator to 10 kw. A thermocouple lashed to the shaft indicated when the desired 500 F. had been reached. Output was then reduced to 2 kw. and intermittently stepped up to maintain this temperature throughout the core of the shafting.

With the first stage of heating completed, the work coil was temporarily moved aside to make room for the first weld bead. Electrodes of 3/16-in. diameter were used with a direct current of 175 amp. To prevent the shaft from cooling off while the weld was being chipped, it was reheated by the same method prior to the next two passes. The third bead was laid with a ¼-in. electrode, 300 amp.

At this point, the weld had been built up to a thickness of 2 in. It was normalized at 500 F. for 30 minutes, and a radiological examination was made. No flaws being disclosed, welding continued until the shaft diameter at the point of fracture was up to the required size. Final normalization was accomplished by heating the work at 500 F. for 60 minutes and then lowering the temperature to 200 F. for 90 minutes. A final check with a gamma radiograph was made at the last temperature. —*McGraw-Hill World News*

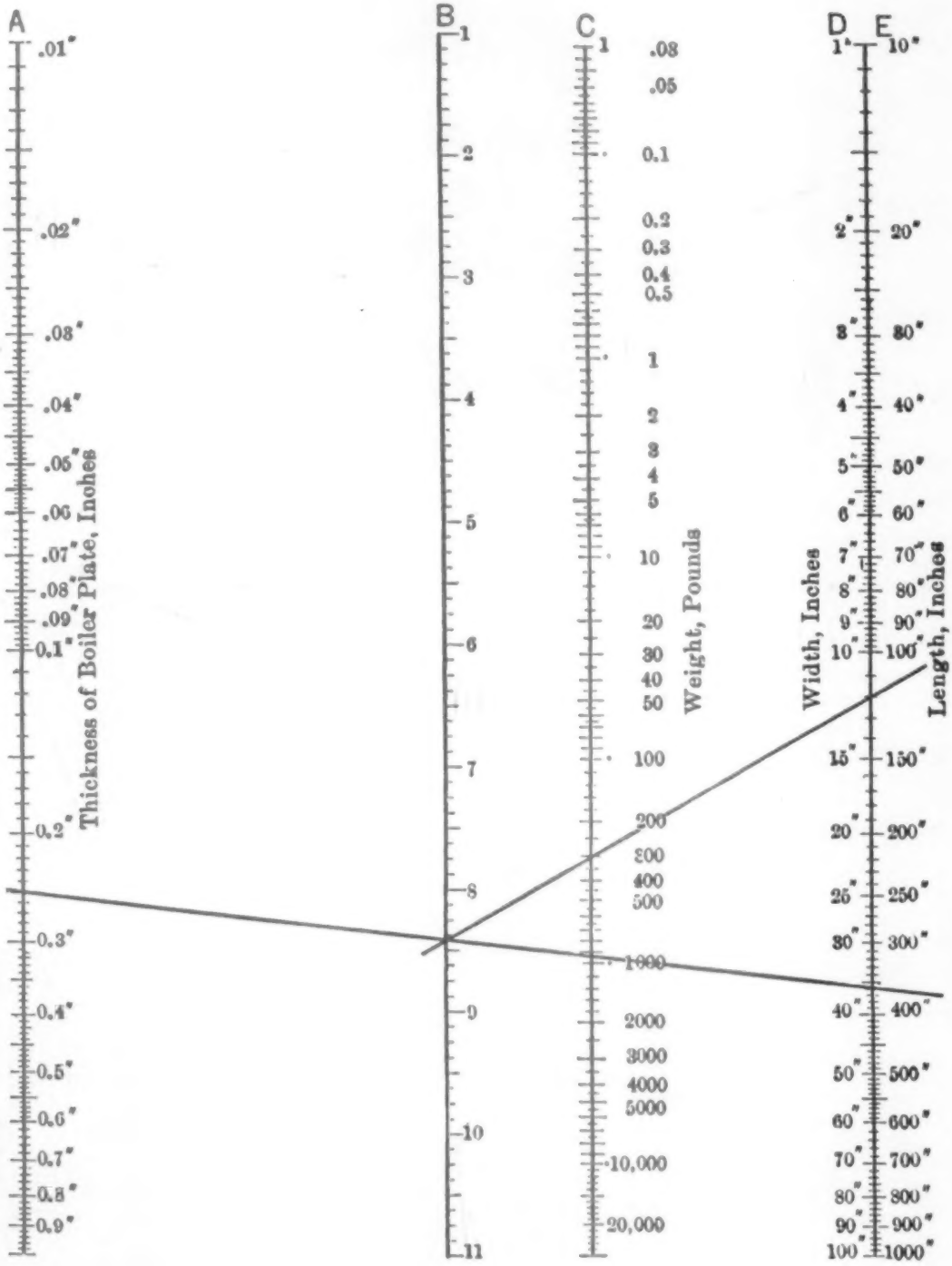
* * *

Allied Steel Adds Story to Warehouse

ALLIED STEEL PRODUCTS INC., Cleveland, has broken ground for a one-story addition to its warehouse facilities. The new building, a brick-and-steel structure, will represent, with new equipment, an expenditure of about $125,000. The building will be bounded by Broadway, Wire and Skrim Avenues.

Weights of Steel Plates

BY W. F. SCHAPHORST



To calculate the weight of any steel plate when its three dimensions are known, use the above nomograph. First, connect the thickness, found in column A, with the length, column E, by means of a straight line. Note the point of intersection with column B. Connect that point on column B with the width, column D, by means of another straight line. The intersection of the second line with column C will give the required weight in pounds.

For example, a steel plate is ¼ in. thick, 30 ft. long and 12 in. wide. What is its weight? In this instance, we connect the thickness (0.25 on column A) with 360 on column E (30 ft. length × 12 = 360 in.). From the point of intersection on column B, we run another line over to the 12 on column D. The intersection with column C then tells us that the weight is a trifle over 300 lb.

The range of this chart is great enough to take care of nearly any steel plate. Thicknesses vary from 0.01 to 1 in., widths from 1 to 100 in., lengths from 10 to 1,000 in. (83⅓ ft.). The weights included run all the way from 0.03 to 25,000 lb.

Worn Out?

not with NI-ROD in the shop!

Badly worn cast-iron cam. The first beads of Ni-Rod have been laid.

The problem: When this large cast iron cam wore out, it laid up a power shear in the sheet metal plant of McGruer, Fortier, Meyers, Ltd., Montreal, Canada.

Their maintenance men found that the minimum replacement time for the cam would be three weeks. To get the shear back in service sooner, they decided to try repairing.

The solution: The worn camming surfaces were built up with Ni-Rod* and subsequently machined to contour. The Ni-Rod deposit thus formed the new wearing surfaces.

Result? The power shear was back on the job within *3 days* instead of 3 weeks!

This is a *typical* Ni-Rod story — sound, strong, machinable welds in cast iron. Preheating is seldom required. Ni-Rod's easy-to-control arc facilitates cast iron repair work; cuts overhead on tough assignments. It works on both A.C. and D.C.

Check Ni-Rod's superiority in your own shop. Order a 5-lb. package from your nearest INCO distributor. Available in 3/32", 1/8", 5/32" and 3/16" sizes.

*Reg. U. S. Pat. Off.

Worn surfaces have been built up with Ni-Rod.

Cam, after machining. Ni-Rod deposit now forms the wearing surfaces.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York 5, N.Y.

DISTRIBUTORS:

Whitehead Metal Products Company, Inc.
Steel Sales Corp.
Pacific Metals Company, Ltd.
Eagle Metals Co.
Robert W. Bartram, Ltd.
Wilkinson Company, Ltd.
Hollup Corporation
Williams and Company
J. M. Tull Metal & Supply Co.
Metal Goods Corporation
Alloy Metal Sales, Ltd.
Metal & Thermit Corporation
National Cylinder Gas Company

EMBLEM OF SERVICE
INCO NI-ROD
TRADE MARK

SEND FOR FREE INSTRUCTION BOOKLET

Only a Prosperous America Can Be Free

DURING May 50 million American workers will get from the Congress of the United States a real incentive to work.

This incentive is called a tax cut. Beginning May 1, the withholding tax on incomes will be reduced, giving everyone a much-needed increase in take-home pay.

But the tax cut will have a far more important effect. It may be literally a life-saver for American employment and production—and, hence, for the stability of the world. It will help to do two things which must be done if our economy is to continue to furnish good jobs and good earnings.

1. *It will generate part of the private funds for investment in common stocks—the "risk capital" which we need to sustain prosperity.*

2. *It will provide part of the incentives necessary to make American business management still more effective.*

These two predictions are not advanced as matters of opinion. They are based on facts reported by McGraw-Hill field editors.

These facts show why the reductions in upper bracket income tax rates are most significant for our continued prosperity. For the first time in more than twenty years the tax burden on people who can afford to risk their savings has been lightened. To find out what this will mean to the economy, McGraw-Hill field editors all over the nation asked a group of business executives making $15,000 a year or more how they will use the money which the tax cut gives them. Here is what they said:

1. They plan to save—not spend—three-fourths of the money they keep as a result of tax reduction.

2. They plan to invest one-half of these savings in common stocks. If all persons making over $15,000 follow this pattern, they will make available about a half billion dollars of risk capital for American industry.

WHAT THE TAX CUT WILL DO

What will upper bracket taxpayers do with their tax savings?
What can business expect as a result?

TO ANSWER THESE QUESTIONS, McGraw-Hill field editors interviewed a carefully selected sample of business executives earning $15,000 a year or more. Here, for the first time, are solid facts that show how tax reduction will effect the supply of risk capital and business incentives. These are the results:

1) How much of your tax reduction will you save?	74%
2) How much of your tax savings will you invest in common stocks?	52%
3) Will lower taxes lead you to switch some of your investment in bonds to stocks?	Yes 28%
4) Have you passed up an opportunity to invest in a new business in the last five years because the return after taxes did not justify the risk?	Yes 40%
5) Will lower taxes make you more inclined to take a risk on a new business?	Yes 80%
6) Have you turned down the opportunity to take a bigger job in the last five years because taxes would take too much of the additional income offered?	Yes 13%
7) Do you know of actual cases of executives who have turned down bigger jobs or more work because of taxes?	Yes 38%
8) Will lower taxes make you more inclined to take on a bigger job or more work?	Yes 59%

3. They also will switch some of their present savings from bonds and bank accounts to common stocks. This might easily add a billion dollars or more to the supply of risk capital.

The one-half billion dollars of tax savings and the funds switched from other investments into common stocks is not enough to end the shortage of risk capital. But it is a start.

Before passage of the tax law, risk capital had been growing increasingly scarce.

One measure of the scarcity is that last year only four-tenths of 1% of national income went into new common stocks. In 1925, a year of normal prosperity, almost 3% of national income was invested in new common stocks.

Another measure is that between 1940 and 1947 people actually reduced their holdings of corporate stocks and bonds by nearly a billion dollars. During the same period, people salted away almost $150 billion in such safe havens as cash, bank deposits, and government bonds.

This drought of risk capital hit us just when we need a vastly increased flow of risk capital to finance the expansion and improvement of our American productive machine. We need risk capital to search for new oil fields and to build new pipelines and refineries. We need capital to expand our over-loaded electric and gas utilities. We need it to finish re-equipping our airlines and railroads and bus lines. We need it to modernize our textile production. We need it to keep pace in the magical, booming chemical industries. We need it to launch the new industry of television.

We need capital for all this work and for much more besides. And we must do all this work if we are to keep the United States dynamic and if we are to create new and better jobs.

The tax cut comes just in time. As the last editorial in this series showed, the flow of risk capital must double or triple if we are to avoid a cutback in industrial expansion next year. A major reduction in industrial expansion because of a shortage of risk capital would menace our prosperity. Whenever capital expansion has sagged, the whole economy has sagged. That is the record. That is why every American has a crucial interest in breaking the shortage of risk capital.

The tax reduction now going into effect helps relieve that shortage. In my opinion, we need still other tax changes to assure enough risk capital for healthy industry and healthy employment.

We should encourage the rapid depreciation and replacement of plants and equipment to keep America efficient.

We should eliminate the double taxation of stockholders' incomes.

We should permit full averaging of good years and bad in calculating income tax payments.

We should cut tax rates again as soon as we can.

The tax cut of 1948 will prime the flow of capital. We must keep it flowing.

The tax cut also encourages our successful men and women to work harder and more effectively.

The McGraw-Hill editors collected some solid facts to show how seriously heavy taxes have discouraged business leaders. Here they are:

1. One out of seven persons the editors questioned said that they had turned down positions with greater responsibilities because heavy taxes would take most of the greater pay that went with the harder job.

2. Six out of ten executives would be more inclined to accept a more responsible job now that taxes will let them keep more of the added pay such a job would bring.

We all have a stake in incentives which make men work harder, especially talented men. The more we each work, the more we all have.

The tax reductions so far made will leave the government more than enough revenue to meet all its expenses, including the proposed defense expenses, and still reduce the national debt. If more defense money becomes necessary, vigorous economy on less essential government expenses will make possible both stronger military defenses and a better tax system. We need both.

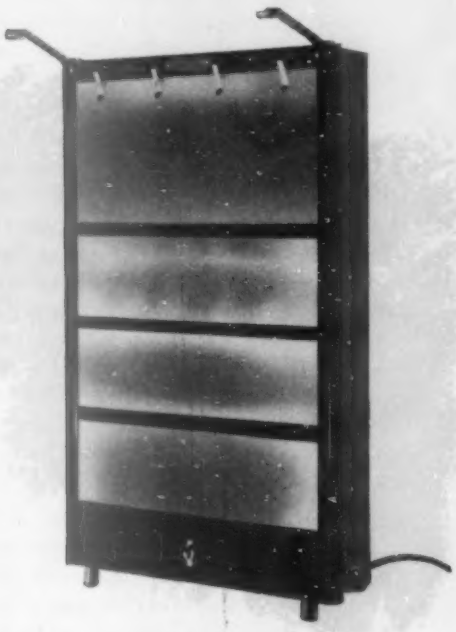
Only a prosperous America can be strong enough to remain free—and to help keep the rest of the world free.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

Welding reaches new levels of soundness . . .

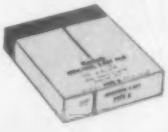
To get the facts on the internal condition of a weld . . . to provide an almost perfect control for assuring homogeneous welds . . . to give the welding engineer (and, where necessary, the customer) a permanent record of the job—use radiography.



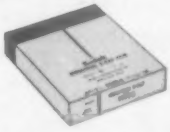
. . . when critical examinations are made with radiography

Radiography provides more information about the internal condition of a weld than is obtainable in any other way. It shows up irregularities, reveals lack of penetration, burned-through areas, gas and slag pockets, undercuts and other weaknesses . . . shows the welder everything he needs to know.

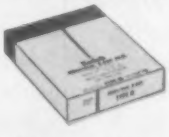
For maximum radiographic visibility . . . use Kodak Industrial X-ray Films . . .



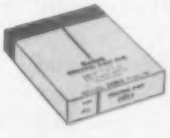
Kodak Industrial X-ray Film, TYPE A...for x-ray and gamma-ray work in sections where fine grain and high contrast are desirable for maximum sensitivity at moderate exposure times.



Kodak Industrial X-ray Film, TYPE K...designed for gamma-ray and x-ray radiography of heavy steel parts, and of lighter parts at limited voltages where high film speed is needed.



Kodak Industrial X-ray Film, TYPE M...first choice in critical inspection of light alloys, thin steel at moderate voltages, and heavy alloy parts with million-volt equipment.



Kodak Industrial X-ray Film, TYPE F...with calcium tungstate screens—primarily for radiography of heavy steel parts. For the fastest possible radiographic procedure.

They provide the high radiographic sensitivity—the combination of speed, contrast, and fine grain—required for the detail visibility you need in critical examination of welds.

For complete information on the types best adapted to your job, see your local x-ray dealer or write to

Eastman Kodak Company
X-ray Division, Rochester 4, N. Y.

"Kodak" is a trade-mark

RADIOGRAPHY

. . . another important function of photography

Kodak

(Continued from page 41)

tem saves greatly in shipping and handling costs as well as office paper work.

Welding Sales Specialists

The mill supply house distributing welding equipment often finds it difficult to be classified as a successful welding distributor. This is not the case with a certain Pittsburgh organization, which has made a point of rendering service as a foundation for its welding sales. Welding specialists do much of the selling. These specialists are paid on a straight salary basis and have a thorough knowledge of all types of welding jobs—a knowledge derived from a background of broad experience. Most of them are men with job shop experience dealing with different jobs, different metals and different processes. Some of them, in addition, have a technical education.

Some distributors question the placing of a salesman, even a specialist salesman, on a straight salary. It is done here, however, because it is felt that a man on a commission basis does not have the long range viewpoint required. The company's primary objective is to build a sales force that will deliver genuine service to its customers. Its welding specialists make regular sales calls and sometimes show a remarkable persistence in dealing with obstinate customers. A salesman who is working on a commission basis cannot repeatedly call on those who won't buy. Should he be paid on a salary basis, however, he can make periodic trips to obstinate prospects, and eventually these trips pay off. One salesman, for example, called on a plant for 11 years before he received a single order. Now, just a few years after the first order was received, that concern is one of the Pittsburgh distributor's best customers.

Mailings and Catalogs

Most welding supply distributors have found that an accurate and up-to-date prospect list is an invaluable asset since it makes possible regular or special mailings to supplement the activities of the sales force. Salesmen, for example, could never announce a new product simultaneously to all prospects. Yet such an announcement must be made sometimes to get all possible orders while the item is hot. A good mailing list also makes it possible to send out selected items of manufacturers' sales literature to customers and prospects.

Many welding supply distributors have found that their success has been enhanced by the publishing of their own catalogs of welding supplies and accessories.

COUNTY FAIR EXHIBITS sell many welders for Saginaw Welding Supply, Saginaw, Mich. Note how prices are chalked on equipment outside the tent

Service and Repairs

Most distributors maintain their own service departments and are able to make at least simple repairs on such equipment as torches and regulators. Such assistance to customers usually pays its own cost in actual dollars and cents and is invaluable as a goodwill builder. More or less typical of service departments is that of an Illinois distributor in a town of about 30,000 population. This particular part of the business averages perhaps 5 to 10% of the total gross volume and is vastly more important as a selling aid. The service department replaces valves and seats in torches and regulators, lacquers and polishes them to look like new. Torch tips are also reconditioned, the clogged orifices being drilled out to correct dimensions.

Few, if any, distributors' service departments can compare with that of a large Philadelphia distributor. This single department of the business employs three trained mechanics and a helper; any of the mechanics is able to tear down an arc welder of any make and put it back in operating order. The only repair work that has to be done outside the shop is the rewinding of armatures and motors.

Duties and Obligations

What are the obligations of the distributor to the manufacturer? We believe that they can be mostly covered under the following ten headings:

1. The distributor should not take on a line he is not qualified to handle unless he has intentions to secure that qualification through proper schooling or additional personnel with the required knowledge.

2. The distributor should adhere to the policies of the manufacturer he represents or else go on record with that manufacturer that he is handling his line with certain exceptions (clearly stated) so that the manufacturer can drop his distribution if he does not care to go along on that basis.

3. The distributor should agree by oral consent and live up to the letter of the law as regards maintenance of the manufacturer's established prices.

4. The distributor should at all times maintain adequate stocks of the products of the manufacturers he represents. He should justify his function of middleman by giving consumers as good or even better service than the manufacturer is able to give him. In placing stock orders, the distributor should take into consideration the ability of the manufacturer to deliver and the transportation time that is required from the factory.

5. The distributor should keep di-

rect shipments from the factory to his customers to an absolute minimum. In the scheme of distribution, he is duty-bound to invest his money in stock and to order in larger than consumer quantities. This is the only reason for having a distributor and paying him from 30 to 50% commission. The commission is not justified if he does not distribute.

6. Distributors should religiously follow up all of the consumer inquiries referred to them by the manufacturer. The follow-up should be prompt, courteous and complete. Mostly the inquiries originate from the manufacturer's advertising; and each and every inquiry, in terms of advertising dollars spent, costs from $10 to $25. Results from the inquiry follow-up should also be reported to the manufacturer.

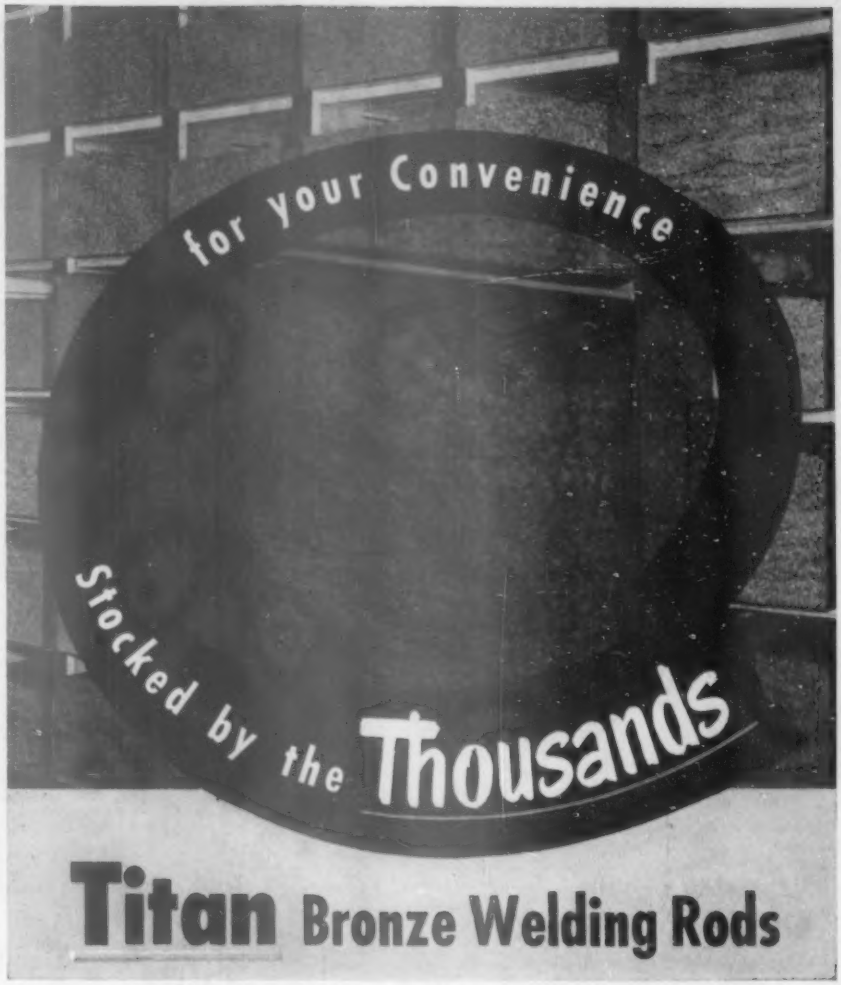
7. Distributors should order manufacturers' literature in sensible quantities. Such literature is very expensive and constitutes a large part of the manufacturer's advertising dollars. Literature that is ordered from the manufacturer and not used is a dead waste. The distributor should place the ordering of literature in responsible hands — someone who knows its value and knows where it will be used after it is received.

8. While always endeavoring to please his customer, the distributor should also keep in mind manufacturers' problems regarding delivery, adjustments, defective material or workmanship that gets by inspection.

The manufacturer and distributor should work as a team, pulling together and not at cross-purposes. If a distributor cannot speak well of a manufacturer he represents, he should sever the representation.

9. The distributor can be of much assistance if he keeps the manufacturer advised of developments in his own territory, both concerning competition and with regard to his own line.

10. Plant visitation should not be a one-sided obligation of manufacturers' sales representatives. Distributors ought to visit the plants of the various manufacturers they represent and acquaint themselves more fully with the manufacture of the products they are selling. It is especially fruitful to talk to the individuals in the plant who are charged with the responsibility of producing the product or products handled.



are immediately available in the type you need for your own particular requirements.

What type of bronze welding rod do you require? TITAN Bronze Welding Rods are supplied in seven standard types to meet the specifications for every bronze welding application. Furthermore, they will be shipped to you *immediately,* from stock, in whatever quantity you may need.

and as for **Quality...**

TITAN Bronze Welding Rods are recognized champions by reason of their uniformity and superior welding properties. Titan's exclusive Double Deoxidation process assures ductile, strong, nonporous welds at all times. Play safe on delivery *and* quality—specify TITAN Bronze Welding Rods. Literature on request.

TITAN Metal MANUFACTURING CO.
GENERAL OFFICES AND PLANTS
BELLEFONTE, PA.

OFFICES AND AGENCIES
NEW YORK - CHICAGO - SAN FRANCISCO
LOS ANGELES - DETROIT - CLEVELAND
CINCINNATI - ST. LOUIS - MINNEAPOLIS
TULSA - DENVER - SALT LAKE CITY
ATLANTA - NEW ORLEANS
EXPORT OFFICE: 70 PINE ST., NEW YORK 5, N. Y.

Quality Alloys by Brass Specialists
Brass and Bronze Rod · Forgings · Die Castings · Welding Rods

New Products to Use

LIGHT SHEETS or heavy plates may be joined with new "Arcrite" welder, designed for maintenance or production welding

A-C Welding Outfit

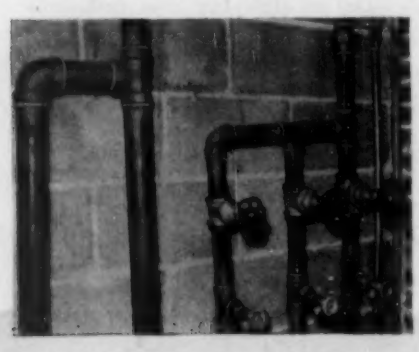
OPERATING on the moving coil principle, the new "Arcrite" a-c arc welder provides a current range of from 25 to 250 amp for joining materials from light sheet steel to heavy plates. It is able to weld castings that require a ¼-in. welding rod and deep penetration. Current control is continuously adjustable by means of a hand wheel, while glass and mica provide burnout-proof insulation for the transformer.

This new welder measures 18 by 18 by 37 in. and weighs 300 lbs. It is sold with accessories including helmet, welding and power cables, electrode holder and ground clamp, making a complete welding outfit. MELLAPHONE CORP., Main and Hamilton Sts., Rochester 2, N. Y.

* * *

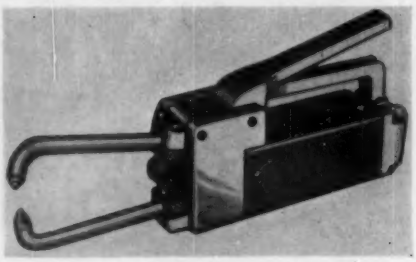
Malleable Pipe Fittings

"FLAGG-FLOW" is a new malleable-iron pipe fitting made for brazed joints in water, oil or other pipe lines. Designed for oxyacetylene silver brazing to black steel or wrought-iron pipes, Flagg-Flow fittings are currently made in sizes up to and including 2 in. These fittings are applicable wherever 150-lb, standard-weight, black malleable screwed fittings are used; that is, for 150-lb working steam pressure at 450 F or 300-lb pressure at 150 F. No wrench clearance is needed in the installation since the fittings can be faced in the position desired and brazed from any angle. The silver alloy flows by capillary action to form a seamless joint. If desired, joints may be made flush against the wall or against each other. STANLEY G. FLAGG & CO., INC., 1421 Chestnut St., Philadelphia 2.



RADIANT HEAT manifold system. Malleable-iron fittings were silver brazed

* * *



MILLER welder operates on tong principle

Welding Tongs

FOR hard-to-reach spots, a compact 23-lb. tong-type spot welder is being offered by the Miller Electric Mfg. Co. Replaceable tips and tongs, available in 6, 12 and 18 in. lengths, enable the weldor to reach the hard-to-get-at-corners. Tongs are ⅝-in. copper bar stock, and tips are of special copper alloy tapered to a ⅛-in.-diam. cone head. Welds may be made up to ⅛-in. of combined metal thickness. Available for either 110-v or 220-v d-c lines. MILLER ELECTRIC MFG. CO., Appleton, Wis.

* * *

Electronic Timers

RECOMMENDED for control of spot welders, grinders or hydraulic presses, Photoswitch electronic timer series 30 has a range of from 0.03 seconds to four minutes. Timers in this series provide for all basic types of timing through simple terminal panel connections. A single timer may be wired to permit interval timing, delayed action, automatic repeat and programming or variations of these.

Specifications of the series 30 are: supply, 115-230 volts, 50-60 cycles; output, two single-pole, double-throw switches; relay contact rating, 10 amp, 115 v, a-c (main output) and 1 amp, 115 a-c, auxiliary. Accuracy is said to be within 2%. PHOTOSWITCH, INC., 77 Broadway, Cambridge 42, Mass.

WELDING GENERATOR has one moving part. Uses a-c/d-c electrodes regardless of polarity or position

Weldor's Welder

OF radically different design, the new "Weldor's Welder" is said to embody principles and circuits discovered and perfected for war purposes and only recently made available for private industry to use in welding. It is made almost entirely of magnesium, except where iron is needed to concentrate the magnetic field, and its design provides for the generation of both a-c and d-c potential, which produces a powerful self-exciting magnetic field because of the arrangement construction of the stator and rotor (poles and coils) assemblies. Rectifiers and/or fixed magnets strategically placed in the several circuits also help to produce and induce mutually intense magnetic fields, completely self-exciting, that in operation become progressively increased in intensity.

This new weldor has but one moving part. All d-c motor-generator exciters, brushes, brush holders, rings, commutators, sectors and segments are eliminated. Maintenance therefore is confined to greasing the two 4-in. ball bearings once every year or so. By operating at 360 cycles instead of 60, the welder gives a very smooth, hot arc, states manufacturer, that will take either a-c or d-c electrodes without regard to polarity or position. Other advantages claimed are that there is no magnetic blow and little splatter. The Weldor's Welder is offered in two voltages and three different welding ranges as generators and also in three portable gasoline-engine-driven direct—coupled models. THE A-C DEVICES CO., 8008 Champlain Ave., Chicago 19.

* * *

Rust Preventative

"ZINCILATE" is a new corrosion-resistant coating for steels which will dry without baking. It may be applied on the production line by dipping, spraying, brushing or roller coating with conventional finishing equipment. The coating is so flexible that it does not break even when coated sheets, pipes and forms are bent double. Overcoatings of enamel, paint or wrinkle finishes may be applied over "Zincilate" after five minutes of air drying. INDUSTRIAL METAL PROTECTIVES, INC. Dayton 2, O.

MOTOR DRIVEN tractor-type semiautomatic submerged-melt welder. Accommodates electrodes from ⅛ to 7/32 in. Current adjustment is 300 to 1,200 amp

Semiautomatic Welder

RECOMMENDED for welding all types of joints, a new semiautomatic "hidden-arc" d-c welder utilizes a bare metallic electrode fed through a granular flux deposited on the joint. Sufficient flux is applied to blanket completely the arc and molten metal; the unfused flux is reclaimed for further use. The welding head is normally used in conjunction with a special 1,200-amp automatic welding set that permits current adjustment from 300 to 1,200 amp.

Particular advantages of the new equipment are:

One type and grade of flux together with one analysis of electrode, can be used with the same procedure for a wide range of steel analyses. For example, ingot iron and steels up to 0.40% carbon can be welded with the same procedure.

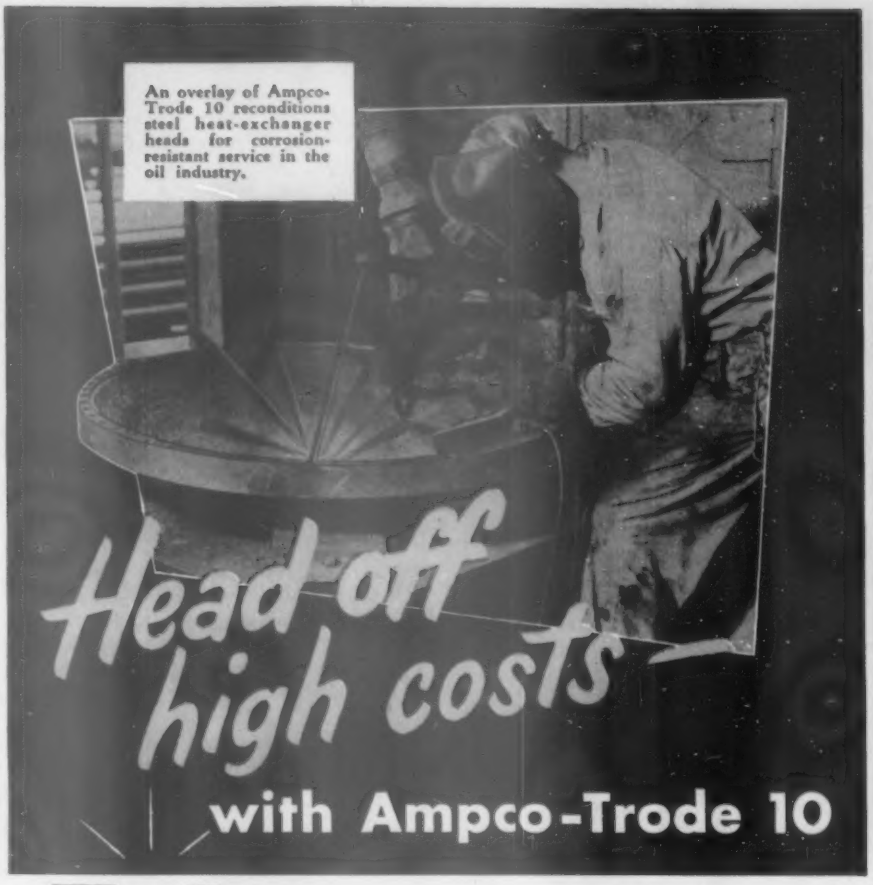
Equipment will take ⅛ to 7/32 in. electrode without change of drive rolls, wire contacts or control. Electrode will feed in either direction by means of the wire motor, controlled through a special exciter.

Standard head may be changed from butt to fillet welding in a few minutes. In making fillet welds the lower wire guide and flux tube are changed from straight to curved, thus permitting the head and wire reel to be left in their normal position. Wire is fed in at 40 deg from horizontal, giving an effective throat for horizontal fillet welds. THE LINCOLN ELECTRIC CO., Cleveland 1.

* * *

Spot Weld Sealer

DEVELOPED to give a leakproof seal between spot-welded plates, a new plastic compound, No. 261 Sealer, may be brushed or sprayed on the faying surfaces prior to welding. Upon cooling, it flows in and around the weld. Proper adjustment of welding control and equipment is necessary, however, since the material is organic in nature and will burn if overheated. For most jobs, a small bead or one of the faying surfaces is all that is needed. There are several other types of compounds for different applications. PRESSTITE ENGINEERING CO., 3900 Chouteau Ave., St. Louis 10.


An overlay of Ampco-Trode 10 reconditions steel heat-exchanger heads for corrosion-resistant service in the oil industry.
Head off high costs
with Ampco-Trode 10

—avoid frequent replacements by using durable corrosion-and erosion-resistant overlays

Ampco-Trode 10 aluminum bronze arc welding electrodes save money for users every day — making parts last longer, increasing productive time, cutting maintenance costs.

Reconditioning steel heat-exchanger heads in the oil industry is a typical case. Subject to erosion and corrosion, these heads are quickly impaired in service. To avoid expensive replacement, they are reconditioned with Ampco-Trode 10, an aluminum bronze welding electrode. ¼" electrodes are used, deposited with a fast wide-weave bead to minimize base-metal pick-up. No finish grinding is required. The superior corrosion-resistant qualities of this aluminum-bronze overlay actually make the head "better than new."

You, too, can save time and money with Ampco-Trode 10! Use it to weld dissimilar metals—for bearing surfaces where hardness and friction resistance are important—for process equipment where corrosion-resistance is essential. See your nearest Ampco distributor today for a supply of these money-saving electrodes. Write for bulletins giving complete information.

Ampco Metal, Inc.

Department WE-5, Milwaukee 4, Wisconsin

Field Offices in Principal Cities

TAKE A NUMBER * FROM 1 TO 12!

● Take a number from 1 to 12 and you are sure to find just the right size among Sight Feed's 12 models to fit your shop — and to fit your pocketbook, too!

● Sight Feed Acetylene Generators range from the 6-pound portable size—30 cubic feet per hour—to the 600-pound stationary size—1200 cubic feet per hour. No matter what your acetylene requirements may be—there is a Sight Feed to fit your needs.

● Illustrated is the new 25PS Sight Feed Acetylene Generator. One look tells you that it is truly portable, easily moved, in the shop or out on the job. Note the famous Sight Feed Visible Supply of carbide—you know where your reserve supply stands at all times.

● If you are interested in saving 50% to 75% on your acetylene—see the Sight Feed at your distributor's store or write for free literature.

"Sold only through recognized distributors"

Sight Feed

THE SIGHT FEED GENERATOR COMPANY · RICHMOND, INDIANA

TYPE C, 20-kw, 450-kc r-f generator. Applications cover soldering, brazing, hardening

R-F Generators

WESTINGHOUSE now offers three new 20-kw, 450-kc radio-frequency generators that consolidate generator, work table or sink, current transformers and water fittings into one unit requiring a minimum of floor space.

Type A is a single-position unit suited to brazing and soldering; Type B, another single-position unit for hardening applications, has a built-in work sink and two sets of water fittings. Type C, adaptable to soldering, brazing and/or hardening applications, combines a built-in sink, two sets of coil and quench water fittings and two current transformers with automatic transfer switch to provide two independently controlled work positions.

Stepless power output control from 0 to 20 kw provides operating flexibility and insures uniform performance on repetitive setups. WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, Pittsburgh 30.

• • •

Electrode for Cast-Iron

A new nickel-cored electrode, All-State No. 4, is recommended for cast iron whenever free machinability and perfect color match are required. On certain castings it is said to have a greater affinity for the parent metal than a copper-nickel electrode. Because of the low amperage required and the ductility obtained, this electrode is recommended for the repair of cylinder heads and motor blocks. It can be used on either a-c or d-c and is available in 3/32, 1/8 and 5/32 in. diameters. ALL-STATE WELDING ALLOYS CORP., 96 W. Post Road, White Plains, N. Y.

• • •

Safety Ventilator

PORTABLE, motor-driven safety ventilator, "Saf-T-Air," has a capacity of 425 cfm per minute, yet it weighs only 50 lb and will easily pass through small hatchways and hard-to-get places. It is made of non-corrosive, spark-proof aluminum. This ventilator is recommended for all welding applications where there is a deficiency of oxygen. UNITED ELECTRIC MOTOR CO., 178 Centre St., New York City 18.

EVEN ARC WELDERS HAVE GENERATOR BRUSH TROUBLE!

OHIO

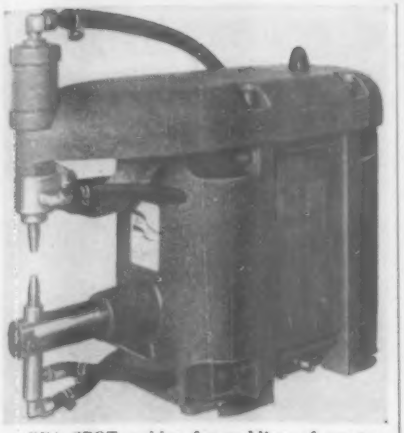
ARC WELDER GENERATOR BRUSHES GIVE *Stable* PERFORMANCE

We have compiled catalog number 15 to aid you in the replacement of generator brushes for your DC Arc Welders. This reference book lists welders alphabetically by manufacturers name and numerically by model, type and amps, together with other pertinent data such as Ohio brush numbers, quantities of brushes required per set, etc. All brushes are illustrated.

WRITE TODAY FOR CATALOG 15

BUY YOUR CARBON BRUSHES FROM A SINGLE SOURCE

THE OHIO CARBON COMPANY
12508 BEREA ROAD
CLEVELAND 11, OHIO



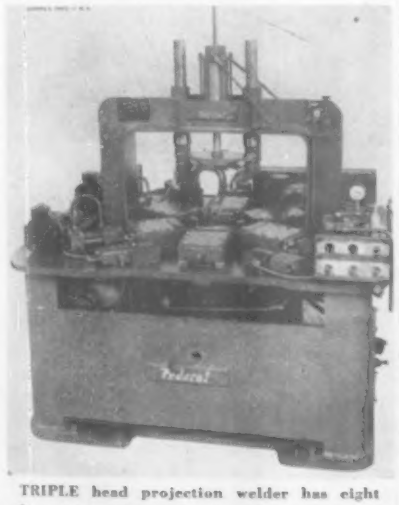
3-KVA SPOT welder for welding of up to 22-gauge mild-steel. Operates in any position

Air-Operated Spot Welder

HAVING a 5-in. throat and a 1-in. stroke, a 3-kva spot welder is offered for high-production welding of 22-gauge steel sheet. It is said to operate with equal ease in any position, to be quickly adjusted to new applications and to require minimum of maintenance. Welders of this type may be set up in a series operated by a single timer and foot switch.

Welder has a 220/440-volt, 60-cycle, water-cooled transformer with three ranges of heat regulation and is equipped with ¾-in. water-cooled holders taking No. 1 Morse taper points. BANNER PRODUCTS CO., 4960 No. 29th Street, Milwaukee 9.

* * *



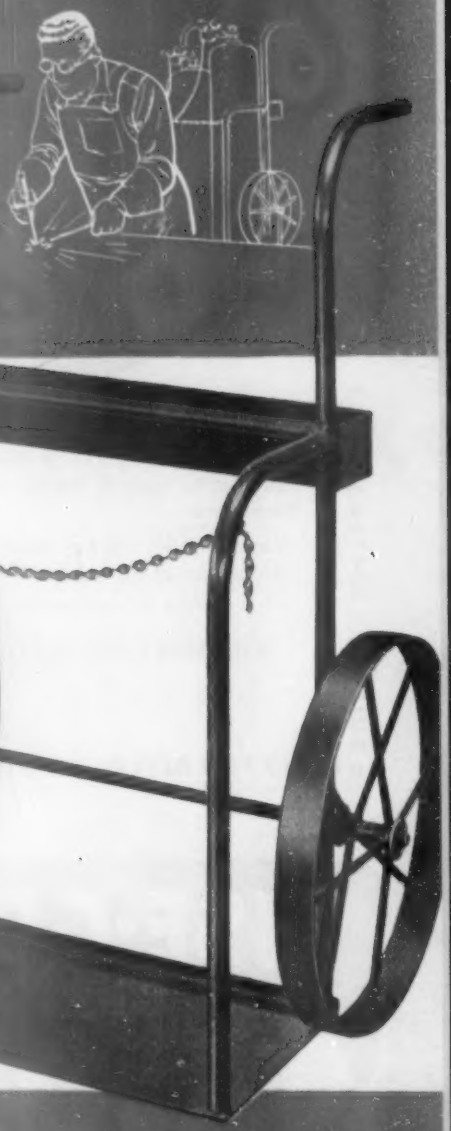
TRIPLE head projection welder has eight heat steps and a cycle time of five seconds, turns out 150 assemblies per hour.

Projection Welder

A TRIPLE-HEADED projection welder designed for joining brackets to cooling fins on compressor assemblies is equipped with two current-carrying locating dies and one clamping die operated by a hydraulic cylinder. Welding head dies incorporate an equalizer which insures equal pressure at all four projections. Dies permit an adjustment of the mounting bracket to facilitate location of different sizes of compressor assemblies.

The welder has a 150-kva transformer with eight steps of heat regulation and is capable of producing 150 compressor assemblies per hour. FEDERAL MACHINE AND WELDER CO., Plant 2, Warren, O.

Adams cylinder trucks load easier... roll easier...



Adams cylinder trucks are "built for the job"—to fit one or more of any size gas cylinders. They are designed and built to load easier and to carry easier. There are 15 cylinder truck models with steel or rubber tires, one to meet your requirements, whatever they are. See your Welding Supply Distributer.

Adams cylinder trucks are nationally sold only through Welding Supply Distributors.

No. 121—For large oxygen and acetylene cylinders

No. 143—Ball bearing, rubber tired tandem model for 60, 70, 80, 100 and 122 cu. ft. cylinders

No. 161—Ball bearing, rubber tired single cylinder truck for plant handling and delivery

No. 170—Tandem model, for 40 cu. ft. acetylene cylinders and 55 to 80 cu. ft. oxygen cylinders

ADAMS
MANUFACTURING AND SUPPLY COMPANY
1522 North Indiana Street
Los Angeles 33, Calif.

• BUILT FOR BETTER SERVICE • BUILT FOR BETTER SERVICE •

BUILT FOR BETTER SERVICE • BUILT FOR BETTER SERVICE • BUILT FOR BETTER SERVICE • BUILT FOR BETTER SERVICE •

One Piece Molded Safety!

Here's practical, fine quality protection at a price you can afford.

Molded from one piece of sturdy fibre. No rivets to loosen, tear or burn out. Shock proof and light proof. Deep molded for positive protection. Well ventilated, comfortable and easily sterilized. Convenient, quick adjusting headgear.

Model 1250 shown here, is available with quick-change metal coverplate, lense holder.

Write for our Welding & Safety Equipment Catalogs.

DOCKSON CORPORATION 3839 WABASH • DETROIT 8, MICH.

• BUILT FOR BETTER SERVICE • Dockson

VISE-GRIP
Welding Clamp

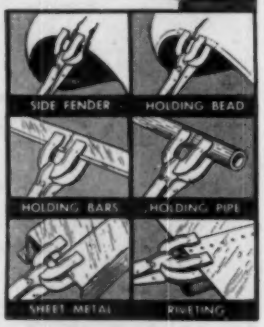
LOCKS Parts in Perfect Alignment

Leaves Hands Free for Welding

9 In. $2.95

FENDER-WELDING IS NOW AMAZINGLY QUICK AND EASY! Merely place these deep-throated U-shaped jaws over the split edges to be welded . . . close the toggle-lever. This brings the edges into perfect alignment, and holds the work in a mighty, non-slip grip, freeing both hands for handling the welding equipment. Other welding jobs are done as easily and quickly.

Thousands of welders say: "The VISE-GRIP Clamp is sure a honey of a tool!" VISE-GRIP's famous double-lever action enables the grip of one hand to easily LOCK the jaws to the work with powerful pressure. End-screw provides jaw adjustment up to 1 5/8". The clamp is 9 inches long. Only $2.95.



Order from your jobber or direct from

PETERSEN MFG. COMPANY, Dept. WE-5, DeWitt, Nebr.

Makers of the famous Vise-Grip Wrench

AUTOMATIC torch permits interruptions of welding for positioning work without extinguishing flame

Welding Torch

AN automatic welding torch (WA-54) has a lever-operated built-in gas saver. When the user lays down the torch, as he must do occasionally to position his work, the flame becomes a small pilot light. By depressing the lever when work is resumed, the operator has a welding flame ready for use without adjustment. This torch is designed for production work in welding of small assemblies. WALL CHEMICALS DIVISION OF THE LIQUID CARBONIC CORP., 3100 So. Kedzie Ave., Chicago 23.

* * *

LARGE welding jobs are possible with this air-operated vise with safety screws

Air-Operated Vise

MODEL 610 "Vi-Speed" vise is about 75% heavier than the popular standard model of VAN PRODUCTS CO., 1528 Daniel Baldwin Bldg., Erie, Pa. This vise, with larger jaws and wider maximum openings, permit the holding of larger castings, forgings and other pieces for welding, pressing, etc. A slight foot pressure rapidly closes or opens jaws and locks them in either position.

Air regulator and gauge provide jaw pressures ranging from zero lb to 50 times the available air pressure. Adjustable safety screw enables vice jaw-travel to be quickly limited to prevent complete jaw closure.

* * *

Pneumatic Hammer

AN improved pneumatic hammer for weld cleaning, peening and scaling has a locking-type tool holder that eliminates all danger of falling or flying tools. This model "G" utility hammer is 8 in. long and has an approximate speed of 5,000 strokes per minute, on 100-psi air pressure. It consumes 5 cfm of air and weighs 3½ lbs. BORM MFG. CO., Elgin, Ill.

PIVOT-TYPE, foot-operated spot welder. Lower horn can be swiveled or reversed

Spot Welder

A FOOT-OPERATED spot welder of the pivot type is furnished in 12, 18 and 24 in. throat depths. It has a 10-kva glass-insulated transformer provided with a four-point tap switch. A magnetic contactor and simple automatic switch unite to pass current only after pressure is applied to the work. Both horns are adjustable, and the lower one can be swiveled, or even reversed for getting into deep places. This welder may be connected to any single phase a-c power supply of 220, 380, 440 or 550 volts, 25, 50 or 60 cycles. AGNEW ELECTRIC CO., Milford, Mich.

* * *

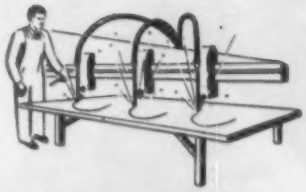
AIR-OPERATED impact wrench. It handles up to 5/8-in. nuts, setting or removing

Impact Wrench

AN air motor of the rotary type furnishes the power needed to operate a new impact wrench for fast nut setting. Wrench has a nominal capacity of 5/8-in. bolts. A built-in torque regulator, readily adjusts power to torque requirements of the individual job. By turning a valve, the tool can be operated in reverse to serve in disassembly and dismantling operations. KELLER TOOL CO., Grand Haven, Mich.

FOR THESE JOBS . . .

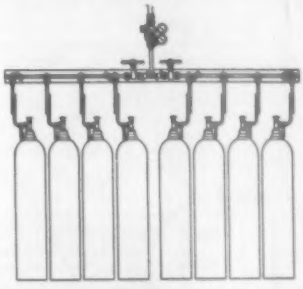
Production Welding



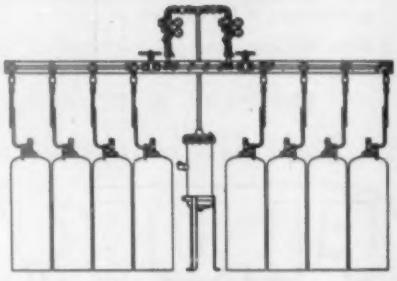
Production Cutting

. . . and operations such as welding and cutting heavy sections with hand torches, flame hardening and softening, flame cleaning . . . also any installation where a battery of cylinders is required.

YOU NEED THESE MANIFOLDS . . .



REGO
Oxygen Manifold



REGO
Acetylene Manifold

BECAUSE OF THESE ADVANTAGES . . .

- *Added Convenience* . . . Individual shut-off valves at each cylinder station permit the removal of any cylinder without shutting down one side of the manifold. Master shut-off valves control flow of each bank of cylinders.
- *Unit Construction* . . . Header assembly, mounted to steel I-beam, is virtually one piece. Extra-heavy pipe is run through header fittings, cylinder station shut-off valves and master shut-off valves, with all permanent connections silver-brazed.
- *Precision Regulation* . . . Uniform delivery pressure is assured by large capacity two-stage Regolators.
- *Exacting Tests* . . . Every RegO Manifold is subjected to a sustained air pressure test before shipment.

REGO* Manifolds for Oxygen . . . Acetylene . . . Hydrogen . . . Nitrogen and other high pressure gases.

*Reg. U. S. Pat. Off.

The BASTIAN-BLESSING Company

4201 W. Peterson Avenue Chicago 30, Illinois

Pioneer and Leader in the Design and Manufacture of Precision Equipment For Using and Controlling High Pressure Gases

for dependable
PERFORMANCE

"FLUXINE" Fluxes are the result of over fifty years of scientific research into the metal-joining field. There are 89 FLUXINE Fluxes . . . one for every welding, silver soldering, brazing, and soft soldering operation . . . each with its own properties, designed for a particular metal-joining operation. All have been perfected not only for highest efficiency, speed, and long life, but for economy and safety as well. FLUXINE Fluxes produce no injurious fumes to irritate eyes or nose of the operator.

Write on your company letterhead for a generous sample stating which FLUXINE Flux you desire.

KREMBS & COMPANY
(Est. 1875)
Dept. G, 669 W. Ohio St., Chicago 10, Ill.

No. 4 FLUXINE, in powder form, for welding cast iron with bronze rods.

No. 7 FLUXINE for welding all types of aluminum.

No. 18C FLUXINE for gas and atomic hydrogen welding of stainless steels and inconel.

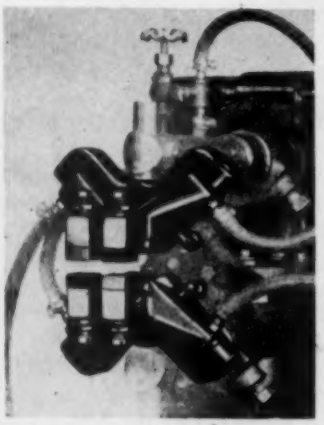
No. 41 FLUXINE used with high-melting silver solders on copper and its alloys and on steel.

No. 42 FLUXINE used with Westinghouse Phos-Copper rods and low-melting silver solders on copper and its alloys.

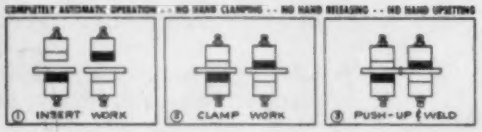
No. 43 FLUXINE . . . non-glaring . . . used when low-melting silver solders are specified. No injurious fumes. Goes further than most fluxes.

FLUXINE
TRADE MARK REGISTERED U. S. PAT. OFF.
FLUXES TO JOIN ALL METALS

. . . . MAKE YOUR SPOT WELDER
A BUTT WELDER IN 2 MINUTES
SIMPLE • INEXPENSIVE



HOFFMAN
BUTT-ON-SPOT
AUTOMATIC BUTT
WELDING ATTACHMENT


COMPLETELY AUTOMATIC OPERATION - - NO HAND CLAMPING - - NO HAND RELEASING - - NO HAND UPSETTING
① INSERT WORK
② CLAMP WORK
③ PUSH-UP & WELD

WELDING EQUIPMENT
MANUFACTURERS
USERS
DISTRIBUTORS
Write today for information on this time-saving, money-saving attachment.

★ The Hoffman Butt-On-Spot Attachment is a water-cooled completely automatic butt welding attachment designed to fit any spot welder having a minimum horn clearance of 7"—manual, air operated, or motor driven.

Maximum capacity dependent on welder KVA capacity but recommended maximum is ⅜" dia. round stock, 5/16" square stock, and ⅛"x⅜" rectangular stock.

ROBERT W. HOFFMAN CO., INC.
8 S. CLINTON STREET, CHICAGO 6, ILL.

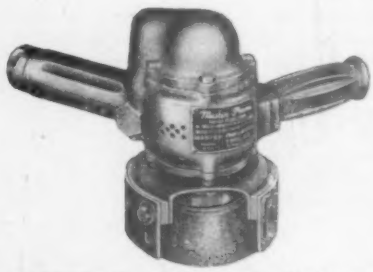
KINMONT POWER UNIT weighs 71 lbs., will turn tanks or pipes up to 30,000 lbs.

Chain-Driven Positioner

CAPABLE of handling work up to 30,000 pounds, a new portable positioning unit operates on the powered chain tong principle. It will turn several hundred feet of pipe set on rollers permitting welding or other operations to be performed over the entire pipe length. Weight of the work is not imposed on the power unit. It is suggested that large objects like tanks be rested on an adjustable roller fixture. The power unit can then be applied to turn one roller, thereby rotating the tank.

The power unit can be used for turning any round, nearly round or hexagon objects requiring not more than 400 lbs. circumferential turning force at a surface speed of 3 to 26 ipm. KINMONT MFG. CO., Los Angeles, Calif.

* * *



OVERHEAD grinding is facilitated with this 7-lb. magnesium-housed vertical grinder

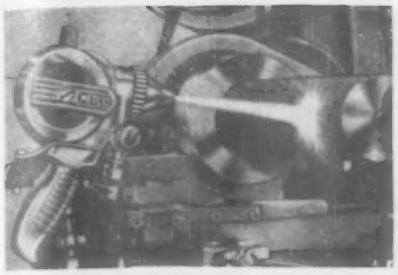
Vertical Grinder

MASTER model M-401 is a lightweight vertical-type grinder, sander and wire brushing tool that permits the operator to work in overhead or awkward positions. It is suitable for such tasks as grinding welded seams on steel plates, removal of scale or paint by wire brushing or general barbering of large or small castings. Grinder weighs only 7 lbs. It is available in speeds of 6,000 and 8,000 rpm. MASTER PNEUMATIC TOOL CO., Keith Bldg., Cleveland.

* * *

Mild-Steel Electrode

AVAILABLE in ⅛, 5/32, 3/16 and ¼ in. diameters, a new E-6012 mild-steel electrode (Airco No. 387) is featured by: (1) smooth bead of proper contour; (2) good operating characteristics on a-c or d-c with a minimum of spatter; (3) operation in all positions; (4) a high degree of welding performance throughout the entire electrode length when high welding currents are used; (5) easy slag removal; (6) more inches of weld per electrode. AIR REDUCTION SALES CO., DEPT. 1815P, 60 E. 42nd St., New York City 17.



METALLIZING gun is said to require one third of normal air power. Uses only 10 cfm, weighs 4 lb, 2 oz.

Metallizing Gun

ONLY ten cu ft of air per minute needed for metallizing is one of the claims of the new "Light Duty-Low Air" gun. Other features are a turbine construction that requires only one third the power, nozzle construction said to assure lower cost per pound of sprayed metal because of the low consumption of acetylene and oxygen, a turbine control with which only one adjustment is necessary for the entire range of metallizing wires. This gun weighs 4 lb, 2 oz. METALLIZING ENGINEERING CO., INC., 38-14 30th St., Long Island City 1, N. Y.

* * *

V-31 DUAL shutoff valve eliminates waste of oxygen and acetylene when welding halts

Shutoff Valve

A NEW quick shutoff valve, Oxweld V-31, is offered by THE LINDE AIR PRODUCTS CO., 30 E. 42nd St., New York City 17. A dual station valve, it controls the supply of both oxygen and acetylene or other fuel gas. When welding is interrupted, the operator merely hangs the torch on a hook, and gas consumption stops immediately. A torch weighing as little as 12 oz will seal the valve. Valve is equipped with a pilot light, which relights the torch with the same flame adjustment when the operator is ready to resume welding.

Valve is made for operating pressures up to 100 psi, but has been tested with pressures much greater. It is supplied with an adjustable base that is easily set for either wall or bench mounting.

* * *

Cutting Tool

"MANCO JUNIOR" fills the need for cutting tool between cutting pliers and the higher priced bolt cutter. It can be used to cut mild-steel bolts up to ¼ in. and to cut rods, screws, nails and fencing of hardness up to heat-treated or hardened steel. Fifty pounds pressure at the handle affords two tons cutting power at the jaws, states manufacturer. MANCO MFG. CO., Bradley, Ill.

For a Better Welding Surface . . .
For a Finer Finish . . .

Van Dorn 6″ Heavy-Duty Bench Grinder
$58.00
also available in 8″ and 10″ models

Use a Powerful New Van Dorn Bench Grinder

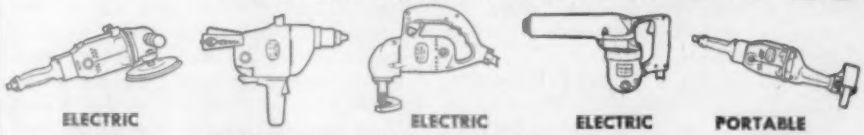
From start to finish, you can count on a Van Dorn Bench Grinder to help you turn out better welding jobs in less time! Before you start welding, use this handy tool with "Whirlwind"* Wire Wheel Brushes to prepare surfaces for welding by removing rust, scale, old paint . . . with a grinding wheel, to do a speedy job of "V-ing out" the joint to be welded. After welding has been completed, it smooths welds by removing excess metal . . . cleans and buffs the surface for final finishing. Does a fast job of sharpening your twist drills, shears and all other tools, too.

Many new features, including streamlined, die-cast housings for improved working clearances . . . Van Dorn-built, "constant speed" motor . . . steel wheel guards and U-shaped tool rests. Ask your nearby Van Dorn Distributor for details. Write for catalog, showing many other metal-working tools, to: The Van Dorn Electric Tool Co., 734 Joppa Rd., Towson 4, Md.

FOR POWER SPECIFY

*Trade Mark Reg. U. S. Pat. Off.

"Van Dorn"
(DIV. OF BLACK & DECKER MFG. CO.)
PORTABLE ELECTRIC TOOLS



ELECTRIC SANDERS | ELECTRIC DRILLS | ELECTRIC "PORTO-SHEARS"* | ELECTRIC HAMMERS | PORTABLE GRINDERS

News of the Industry

British Researchers Work On Tough Welding Problems

"WHILE the general metallurgy of the welding of mild steels is fairly understood, there is much that is obscure about the behavior of stronger ferrous alloys when welding is attempted," said F. A. Fox, assistant director, British Welding Research Association, writing for the British publication, METALLURGIA. "At the same time it is important to try to reach a practical solution of the problem of finding materials of high strength which can readily be welded."

Tackling these and other problems for the British Welding Research Association are several research laboratories and universities throughout the British Empire. According to Mr. Fox, investigations made in the metallurgy department of the University of Birmingham (England) have been concerned with weld cracking. It has been shown that with some alloy steels, brittle transformation products are obtained on severe quenching from a critical temperature range in the region of 1,350 C but that the steelmaking procedure may much effect the steel's sensitivity to this critical temperature range.

In conjunction with the aluminum industry, the association is embarking on a program concerning the welding of aluminum-alloy plate with the inert-gas process, and it is hoped to put through a similar plan on magnesium alloys.

Good properties in the intermediate strength range were found to be obtainable with an alloy containing 5% silicon and 2½% copper. It has also been found that good welds of high strength can be obtained from aluminum-magnesium alloys provided that a suitable degasification procedure is followed during manufacture and precautions taken during welding.

Another problem receiving attention in the laboratories of the British Non-Ferrous Metals Research Association is that dealing with the scatter in tensile strength results obtained on welded magnesium-manganese alloy sheet. Research has shown that the sharp strength variations are largely due to local grain growth and to misalignment of butting edges.

Pressure welding is receiving considerable attention by the British Non-Ferrous Metals Research Association. Conditions of temperature, pressure and surface preparation necessary for the production of satisfactory joints have been established for a number of lightweight alloys. Exploratory work has been carried out on other non-ferrous metals.

British Electrical Research Association is working to provide information on arc phenomena as related to welding behavior. For this purpose, special electronic equipment has been installed and high-speed photography employed.

In the resistance-welding field, a study is being made of the fundamentals of spot welding and of single and multiple projection welding, especially with regard to relations between the variables of current, pressure and time which lead to optimum welding conditions. Projection welding work is concerned with the welding of joints containing more than one projection, with particular reference to the question of weld quality and consistency of strength. Development of simple and accurate equipment for measuring current, pressure and time forms an important part of the work.

A study of the new factors introduced by welding into the design of structures entails considerable experimental research on the behavior of welded constructions of all kinds, not only under static but also dynamic loading.

Investigations thus far on the behavior of beams and columns bent in single and double curvature have revealed that the load which an upright column will safely carry may be several times that which would be permitted by present conventional methods of design which do not take plastic deformation into account. Preliminary findings have indicated that rectangular portal frames designed by the plastic method may be 20% lighter than conventional frames. Before the new method can gain general acceptance, tests on full-scale structures are necessary. It is intended that this full-scale testing will be carried out to complete collapse.

In order to provide information on fatigue behavior, the association has investigated welded structures by setting up vibrations in a member or frame and measuring the induced stress from the amplitude and by strain gauges. The structure is supported in such a way that the vibrations are balanced within the testing unit and do not transmit large forces to the foundations. Pilot investigations have been carried out at the engineering laboratory, Cambridge, and three testing units are now installed at the research station at Abington. Among the investigations in hand or in course of preparation are:

(a) The effect of residual stresses and of stress-relieving on the fatigue endurance of welded steel constructions.

(b) Fatigue strength of spot-welded light-alloy structures.

(c) Fatigue behavior of stiffened plate structures representative of welded ship construction.

Stress distribution in welded pressure vessels is being explored. Particular attention is being given to the stresses set up in the vicinity of nozzles, welded branch connections and other fittings on the shell of a pressure vessel. Additional pumping equipment to permit the use of test pressures up to 10,000 psi will be made available at Abington Hall near Cambridge.

In addition, emphasis is being placed on the design and strength of welded pressure pipe connections, with special reference to oil installations. A series of investigations is being undertaken to compare the behavior of welded and seamless pipe bends. The bends to be tested are of 6-in. diameter, 90-deg. angle, and they will be subjected to pressure and bending load conditions. In general, the measurements are to be made with electric resistance strain gauges, attached both to the inside and outside of the bends. Brittle lacquer coating is being used for preliminary tests to determine the best location for the strain gauges in the main series of tests.

RESEARCH WORK being carried on at Park Crescent, London, for British Welding Research Association

* * *

Allis-Chalmers to Handle RCA High-Frequency Products

ALLIS-CHALMERS MFG. CO., and the RCA Victor Division of Radio Corporation of America have made an arrangement whereby Allis-Chalmers will distribute RCA high-frequency heating equipment and metal detectors in addition to its own line of electronic heating equipment. Equipment of this nature now available includes induction heaters ranging from 1 through 200 kw., dielectric heaters from 100 watts through 125 kw and the versatile electronic metal detector.

UNSETTLED RELATIONS between printers with whom we deal and certain of their employees have forced us to use some substitute methods in producing this issue. The results of these deviations from normal may be visible to you. If the printing emergency persists, we may have to resort to still more apparent substitutes. But we intend to let nothing which we can now foresee stop us from bringing to you full-length, clear and typographically pleasing issues.

Cleaning Aluminum Parts Prior to Spot Welding

METHODS of preparing aluminum for spot welding and painting, of protecting finished work against corrosion and of obtaining smooth, lustrous finishes, are discussed in a recent issue of Oakite News Service, house organ of Oakite Products, Inc., New York.

This article describes the procedures employed in a large Eastern plant manufacturing automatic phonographs. Oils, greases, identification marks, fingermarks and oxides must be removed from aluminum parts before spot welding and painting, and this is accomplished by a specialized alkaline solution followed by a deoxidizing treatment which leaves the aluminum in a state of uniform electrical resistance.

Aluminum parts are first tank-dipped in the alkaline solution at 180 F, followed by a cold running rinse. This is said to leave a slight etch on the work. The parts are then immersed in a deoxidizing solution to remove stains, oxides and discolorations. A hot rinse completes the preparation for spot welding. The welded parts are again cleaned and deoxidized to remove new soils and oxides prior to painting.

A free copy of the issue containing the above article may be obtained by addressing Oakite Products, Inc., 175 Thames St., New York City 6.

* * *

Independent Oxygen Group Enjoys Mexico Meeting

ABOUT 75 persons from the United States and Mexico attended the Independent Oxygen Manufacturers' Association recent meeting held at the Rotary Club in Mexico City. Following the business meeting, the visitors from the United States spent several interesting days touring the sights down Mexico way. These included visits to the famous floating gardens just outside Mexico City, a trip to the silver mines at Taxco and a deep-sea fishing expedition at Acapulco.

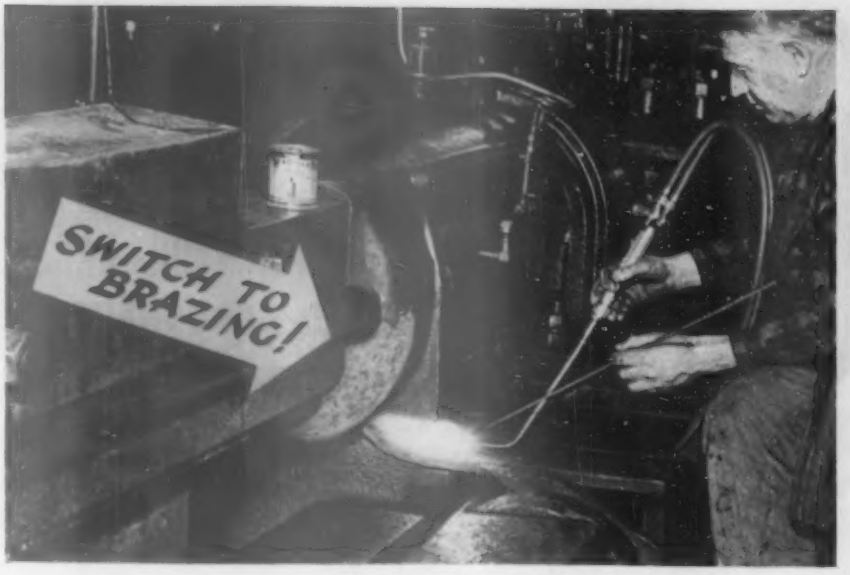
During the week at Acapulco, it was decided to form the Acapulco Oxygen and Fishing Association. Purpose was to "start an oxygen plant in Acapulco; to furnish a good excuse for holding several directors' meetings there during the year.

* * *

Thirty Years a Welding Distributor

SUTTON-GARTEN CO., 401 W. Vermont St., Indianapolis, is celebrating its 30th year in business as a distributor of gas and arc welding equipment and accessories. Oxygen and acetylene were the first products handled by the firm when it was founded in 1918.

Officers of the company are W. R. Garten, president, W. F. Garten, vice-president. R. F. McNutt is manager of the branch office located at 1701 So. Harrison St., Ft. Wayne, Ind.



WATER PUMP FRAME REPAIRED QUICKLY, ECONOMICALLY WITH BRIDGEPORT No. 192 LOW FUMING BRONZE

In only a few hours, the frame of the high pressure pump used in a hydraulic system was repaired by brazing with Bridgeport's No. 192 Low Fuming Bronze Rod. Valuable time was saved, and costly replacement avoided, by this efficient maintenance method.

Bridgeport's No. 192 Bronze Welding Rod flows freely, has good tinning action, and adheres strongly to the parent metal when heated to a cherry red. Costly and time-consuming preheating, slow cooling and stress relieving are unnecessary. Its low fuming characteristics are appreciated by the men who work in close quarters.

For strong, tough repairs of high tensile strength, and for economical fabrication, investigate the advantages of Bridgeport's Bronze Welding Rods. Write for the booklet, "Bronze Welding Alloys."

"Bridgeport" BRIDGEPORT BRASS COMPANY
BRIDGEPORT 2, CONN. • Established 1865

Mills at Bridgeport, Conn., and Indianapolis, Ind.
In Canada: Noranda Copper and Brass Limited, Montreal

WELDING ALLOYS AVAILABLE

BRIDGEPORT No. 192 BRONZE—LOW FUMING
General purpose alloy. Ideal for repairing heavy-duty equipment as well as small parts—building up wearing surfaces—joining parts in industrial and construction work.

NAVAL BRASS
Fuses readily at 1625° F. Recommended for uniting cast iron and steel parts—building up wearing surfaces—joining parts in industrial and construction work.

BRIDGEPORT MANGANESE BRONZE (NAVY)
Recommended for strength and toughness in repairing cast iron and steel castings—building up worn surfaces—joining parts in industrial and construction work.

BRIDGEPORT No. 1232 SILICON BRONZE
Used for oxyacetylene, carbon arc or metallic arc welding methods for making silicon bronze storage tanks, automatic heaters, corrosion-resisting ducts, structural sections, vats, etc.

BRAZING ROD
Satisfactory for conditions that are not subject to great wear or heavy shock loads.

Bronze Welding Rod A PRODUCT OF BRIDGEPORT BRASS

RENEWED CRUSHING POWER!

MANGANAL

TRADE MARK REGISTERED U.S. PATENT OFFICE

11 TO 13½% MANGANESE-NICKEL STEEL

ROUND APPLICATOR BARS REBUILD CRUSHERS

The Gyratory Crusher shown is being built back to size using Manganal Round Applicator Bars. There is a Manganal product for conservation welding of all Manganese, Carbon and Alloy Steel Parts of your equipment. Don't scrap worn equipment! Don't struggle to make worn equipment do the job! Rebuild with MANGANAL!

Name of Nearest Distributor Upon Request

GET THE FACTS FREE! Send for our Booklet, "The Welding of 11% to 14% Manganese Steel."

STULZ-SICKLES CO.

Sole Producers

91 N. J. Railroad Avenue, NEWARK 5, N. J.

National

Carbide

EFFICIENT

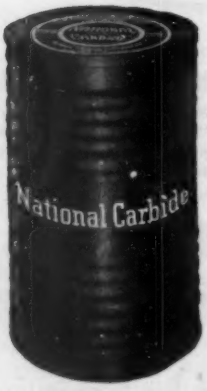
ECONOMICAL

DEPENDABLE

for

Welding & Cutting

SPECIFY



NATIONAL CARBIDE IN THE RED DRUM

Write us for information as to nearest available stock.

NATIONAL CARBIDE CORPORATION

60 E. 42nd St., New York 17, N. Y.

Russians Develop Underwater Welding

SOVIET MINISTRY of River Transport's agency for underwater technical jobs has skilled divers at work on the Volga, Dnieper, Moskva and other rivers putting in submerged facilities for city water systems, oil pipe lines, power stations and smoke ash diverters. This extensive program of subsurface construction is said to embody new techniques for hydraulic trenching and underwater welding and cutting.

A major project, undertaken to improve Moscow's water supply, is the laying of two 56-in. pipes, each about three quarters of a mile long, on the bottom of the Moskva river. This piping is designed for a pressure of 15 atmospheres and has to be welded section by section at a depth of about 50 ft. The work will be done by the best Soviet diver arc welders after special training in pressure conditions approximating the real thing. Underwater welding and cutting, stated here to be a "child of Soviet scientists," was first applied during the war when it was necessary to clear a river quickly of German-demolished steel bridge framework that threatened to impound water and wash out a temporary bridge needed by Soviet armed forces. Following this first successful effort, the Soviet railway ministry in 1942 organized a laboratory for underwater arc cutting. This laboratory has developed a method of combined arc and oxygen operation and also a semi-automatic underwater welding method. Because tanks of oxygen are hard to supply underwater, the laboratory developed a benzo-cutter that has been found very reliable.

New carbon electrodes of long firmness have been developed to replace the tubular steel electrodes formerly used. Soviet engineers say that the latter burn out too quickly underwater. Finally, a technology has been worked out for the underwater cutting of cast iron, bronze, manganese steels and other metals for the purpose of speeding up the salvage of ships sunk during war.

—McGraw-Hill World News

* * *

New Distributor for Resistance Welders

TRI-LINE CORP., a newly formed Buffalo company, is taking over the distribution and field engineering on resistance welders produced by the Progressive Welder Co. and air and hydraulic equipment formerly handled by Industrial Equipment Co. Main office of Tri-Line is at 170 Franklin St., Buffalo 2; branch offices at 135 Spring St., Rochester 8, and 357 Coolidge Ave., Syracuse.

C. C. Tiedman, formerly a partner in Industrial Equipment Co., is president of the new concern. G. H. Schliecker, another former partner of Industrial Equipment, is vice-president and will be located at the main office in Buffalo. L. H. Schliecker is in charge of the Syracuse office, and L. H. Henry heads the Rochester office.

Fumes Don't Endanger Arc Weldors' Health

HAZARDS to the health of arc weldors engaged in steel ship construction are negligible when adequate ventilation is provided to control the toxic fumes released. This conclusion is set forth in the newly published Public Health Service Bulletin No. 298, "Health of Arc Weldors in Steel Ship Construction," just released by the Federal Security Agency of the U. S. Public Health Service. The bulletin describes the results of a study made by the Industrial Hygiene Division, U. S. Public Health Service, in cooperation with the U. S. Maritime Commission and the U. S. Navy Maritime Commission and Navy-contract shipyards. The study was initiated in 1943 because of increasing complaints of respiratory illness from shipyard workers.

Analyses were made of the fume and gas conditions in seven Atlantic, Pacific and Gulf Coast shipyards. In general, the concentrations of welding fumes and gases were relatively low. Some type of control ventilation was available at all yards studied. Although the ventilation was of varying effectiveness, extreme degrees of atmospheric contamination were infrequent.

In the course of this medical survey, 4,650 persons (2,950 men and 1,700 women) were examined. Only a few significant clinical symptoms which might be related to occupational exposures were observed among these workers. Detailed studies failed to reveal any marked blood abnormalities among weldors, and there was no indication that welding fumes, under conditions observed, predisposed workers to pulmonary tuberculosis. Gastrointestinal symptoms were infrequent.

Single copies of "Health of Arc Weldors in Steel Ship Construction," may be purchased at 55c each from The Superintendent of Documents, Government Printing Office, Washington 25, D. C.

* * *

Credit to Apprentices for Previous Experience

BUREAU OF APPRENTICESHIP, U. S. Department of Labor, has published a booklet, "Apprenticeship Credit for Previous Experience," which is based on a study of practices in 39 apprenticeship programs established in a variety of trades in both construction and metalworking industries in different localities. Principles which should govern the granting of credit are described as well as suggested procedures which might be employed for evaluating past experience and allowing appropriate credit.

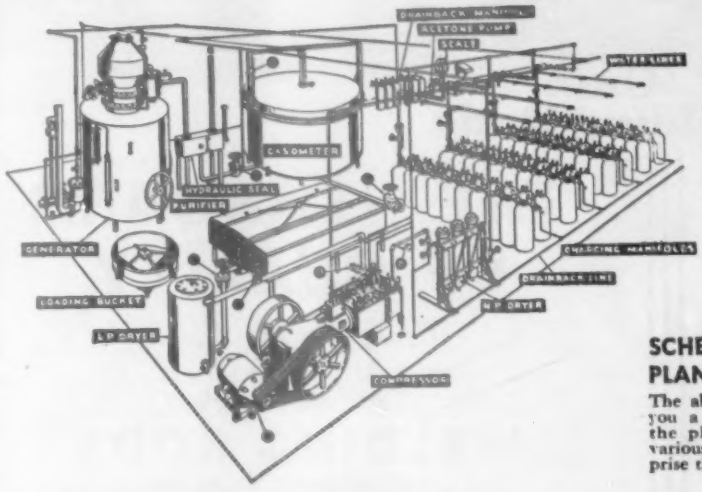
Copies of this booklet may be obtained free of charge by writing to the Bureau of Apprenticeship, U. S. Department of Labor, Washington 25, D. C.

* * *

Metal Products Co. Moves to New Quarters

H. F. BUTLER, INC., formerly Weld-Rite Steel & Metal Products, Inc., has moved its offices and plant to newly equipped and modernized quarters at 687 Lehigh Ave., Union, New Jersey.

A *Low Pressure* ACETYLENE PRODUCING PLANT that Charges up to 160 CYLINDERS at ONE TIME



SCHEMATIC PLANT ASSEMBLY

The above sketch gives you a general view of the placement of the various units that comprise the plant.

For the Prospective Gas Manufacturer this complete plant layout provides for extremely *simple* operation and exceptionally *low* maintenance costs. The entire plant is designed to provide ample storage room for filled tanks and compact enough for the Chief operator to observe all operations. Rated capacity, 2700 cu. ft. per hour.

INDEPENDENT ENGINEERING COMPANY, Inc.
Manufacturers of
CONSULTING · DESIGNING · RESEARCH
CYLINDERS AND GAS PRODUCING EQUIPMENT
ACETYLENE · OXYGEN · HYDROGEN · NITROGEN
O'FALLON, ILLINOIS

WE INVITE YOUR INQUIRIES

High Strength Machinable Welds In Cast Iron . . .

EASIER . . . FASTER . . . CHEAPER

Talk about sound, strong, machinable welds in cast iron Here's a way to get 'em . . . *but fast* . . . every time. Use Ni-Rod* electrodes"

Ni-Rod's easy-to-control arc speeds up all kinds of cast-iron repair work. Cuts labor, time, and costs. Raises welders' success scores on tough jobs.

Ni-Rod gives you thorough fusion . . . close color match . . , smooth bead that sheds slag. Works on A.C. or D.C.

Stocked in 3/32", 1/8", 5/32" and 3/16" sizes. Order a 5-lb. package today.

*Reg. U. S. Pat. Off.

STEEL SALES CORPORATION

Warehouses
Chicago 23, 3348 S. Pulaski Road
Detroit 10, 5151 Wesson Ave.
St. Louis 10, 4565 Mc Ree Ave.

Branch Offices
Indianapolis 2, 1916 N. Meridan St.
Milwaukee 4, 847 W. Virginia St.
Minneapolis 15, 529 S. 7th St.

SEND FOR FREE INSTRUCTION BOOKLET

Fuse-Well
Cast
Welding Rods

THE STANDARD
OF QUALITY
Throughout the World

•

CAST ALUMINUM
WELDING RODS
OF STANDARD ANALYSIS

•

PLAIN AND ALLOYED GRAY IRON
WELDING RODS
AND ELECTRODES

THE CHICAGO HARDWARE FOUNDRY CO.
Dependable Since 1897
548 ENGINEERING BUILDING
NORTH CHICAGO, ILLINOIS

POSITIONED WELDING
CAN REDUCE
YOUR COSTS

Because C-F Welding Positioners make every weld a downhand weld, your welding time and cost is cut to a minimum. Positioned welding permits use of larger electrodes—fillets of correct width and depth can be laid in one pass, with resulting time and material saving PLUS better welding. C-F Positioners with Variable Speed table rotation in any range from 0 rpm and up provide greater flexibility of positioner use in all types of automatic or hand welding. Like all C-F Positioners, these power operated models tilt 135° from the horizontal and full 360° table rotation is possible at any angle.

Investigate the definite cost-saving advantages of C-F Power or Hand Operated Positioners. All models have either variable or constant speed control of table rotation. Write for Bulletin WP.

CULLEN-FRIESTEDT COMPANY
1309 SOUTH KILBOURN AVENUE CHICAGO 23, ILLINOIS

Welding Seer Predicts Future at Chicago Production Show

About 25,000 engineering technicians attended the 48 panel sessions of the Chicago Production Show and conference, held March 22 and 24 at the Stevens Hotel. In connection with the three-day conference, some 100 exhibitors displayed their products and equipment. L. S. McPhee, a member of the Chicago chapter of the American Welding Society, was active on the conference committee, and did much to help make the event a success.

One of the outstanding panel sessions of the three-day affair was that on advanced welding techniques, sponsored by the Chicago AWS section. It was attended by 100 visitors. Chairman for the session was R. E. McFarland, Western Electric Co. He introduced H. C. Boardman, Chicago Bridge & Iron Co., whose paper, "Welding Prophecy," predicted processes of the future.

Mr. Boardman pointed out that a steady increase may be seen in the use of submerged-melt automatic welding because it can use higher currents and weld faster than other methods. It promises to become to railroads and automobile manufacturers what welding became for shipbuilding during World War II.

Progress in the structural field already has been advanced by the building and bridge codes and welding standards put out by the American Welding Society and by the recent promulgation by the American Institute of Steel Construction of a new code raising the allowable stress in butt-welded joints to 20,000 psi in tension and compression, the same allowed in the parent metal. As a result it is evident that there will be an increase in the use of welding of structures now made by other processes.

More welding may be done in the machine tool industry. Manufacturers are learning that machines of speeds to closer tolerances can be made at lower costs with welded steel, and can be designed to operate at higher speeds to closer tolerances and can be fabricated at lower cost.

Mr. Boardman foresaw a tremendous development in the welding of light metals by the inert-gas arc method. Nor did he overlook the welding of non-metallic substances such as glass to each other and to metals. Sufficient progress has already been made in this field to justify the most optimistic predictions.

In closing, Mr. Boardman said he hoped that the present practice of cutting away parent metal and replacing it with expensive filler metal will some day be displaced by a practically heatless square butt joint of opposed atoms that are lured into strong and lasting union by a method as yet unknown.

Following this interesting talk was a "quiz of the experts" program at which a panel of 14 men undertook to answer any and all questions from the audience. The panel included the guest speaker, Mr. Boardman; E. R. Seabloom, Crane Co.; W. C. Pearson, Westinghouse Electric Corp.; C. L. Pfeiffer, Western Electric Co.; R. L. Kohlbry, Machinery & Welder Corp.;

Frank McGuire, The Linde Air Products Co.; J. C. Menzies, C. E. Phillips Co.; Walter Knocke, Weldcraft, Inc.; S. S. Callner, All-State Welding Alloys Co.; E. J. Burrows, Hartford Steam Boiler Inspection & Insurance Co.; E. P. Auler, Taylor Forge & Pipe Works; Charles Druetzler, Electro-Motive Co.; Jack Roscoe, The Lincoln Electric Co., and L. S. McPhee, The Whiting Corp.

* * *

Stainless Steel Production Filmed by Allegheny Ludlum

"MELTING AND REFINING OF MODERN STEELS," a new 16-mm technicolor film produced by Allegheny Ludlum Steel Corp., shows the use of oxygen and other modern techniques for the production of stainless steel as it is melted in an ultra-modern 50-ton electric furnace.

Telephoto lenses used for interior shots make it appear that the camera is actually inside the furnace at temperatures hotter than a hot volcano. Also portrayed is the injection of oxygen into the molten metal for carbon reduction. The onlooker studies the angry bath as the oxygen is injected and also watches from above as the huge furnace top is lifted off to expose the interior.

This 20-minute film may be obtained for free showings by addressing Allegheny Ludlum Steel Corp., Public Relation Dept., Henry W. Oliver Bldg., Pittsburgh 22.

* * *

Lincoln Holds Dinner For 1,200 Employees

A DINNER for 1,200 persons was staged recently at the Hotel Cleveland by The Lincoln Electric Co. in honor of its long-term employees. This was the 32nd such annual event to be given by the company to its employees. Highlighting the event was the awarding of a 40-year pin to James F. Lincoln, president and general manager of the company. Joseph Satava, a 38-year employee, made the presentation and at the same time gave his employer a 50-year pin to be forwarded to his elder brother, John C. Lincoln, founder and chairman of the board.

Mike Pavlik, a Lincoln man for 30 years, also received a pin for his service. Four employees received 25-year pins; five 15-year pins; 56 their 10-year emblems.

* * *

Bastian-Blessing Expands Research Control Department

KEEPING abreast of the rapid advancement of the welding industry, the Bastian-Blessing Co., Chicago, recently expanded its RegO research department so that field contact work may be correlated more closely with the functions and efforts of the company's production, engineering and sales departments.

Robert E. Poethig heads the expanded control department. Prior to joining Bastian-Blessing, he had charge of the sales and engineering departments of a manufacturer of industrial control equipment.

"The Outstanding Basic Improvement in FLEXIBLE SHAFT Machinery in 25 Years"

The NEW Strand Rotoflex 4-speed gear drive Flexible Shaft Machine (shown upper right) is another step forward in Strand quality precision tools for faster, easier, more economical production work. The Rotoflex 4-speed gear drive employs a patented, new type of quick change gear drive utilizing 4 positive speeds by a unique and easy method of instantly changing from one speed to another. Rotoflex machines are powered with totally enclosed ball-bearing motors having speeds from 850 to 9000 R.P.M., depending on motor.

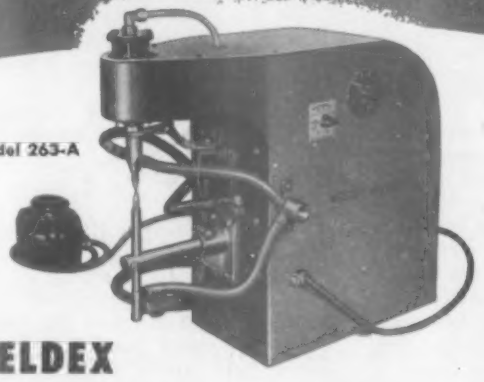
Standard type Strand machines, (lower right) give portable rotary power at constant speeds with dependable results in all grinding, buffing, drilling, wire brushing and rotary filing operations. Hundreds of types and models from ⅛ to 3 H.P. available with suitable attachments for your specific requirements.

Distributors in all principal cities
Ask for Bulletin No. 43 and Catalog No. 30

Strand
FLEXIBLE SHAFTS

N. A. STRAND & CO.
5022 NO. WOLCOTT AVE.
CHICAGO 40, ILL.

PRODUCTION BOOSTER



WELDEX

Automatic Bench-Type Spotwelder

Speeds up high-quality production spotwelding of light metals. Easy to operate, economical to buy.. Straight vertical plunger action—air operated—electronically timed. Rated 3 KVA, handles two thicknesses *18 gauge* C.R.S. or equivalent. Compact, 21" high, 23" deep, 10" wide. Write for Bulletin 200 AB or catalog on complete line from 1 to 7.5 KVA.

DEALERS . . .
Some substantial territories now open. Write for details.

Weldex Inc.
7339 McDONALD DETROIT 10, MICH.

DEALERS!
Cover the LIGHT METAL FIELD!

Weldex now offers a line providing complete coverage of this important market. If you are a substantial dealer in welding equipment, write for bulletins and our proposition.

Model
- 111-RFM Manually operated (Floor Style) 1 KVA
- 111-PBMT Manually operated (Bench Style) 1 KVA
- 362-PFM Manually operated (Floor Style) 3 KVA
- 263-A Air operated (Bench Style) 3 KVA
- 275-R, 275-P, 275-RS Manually operated (Floor Style) 7½ KVA
- 752-R, 752-P Air operated (Floor Style) 7½ KVA

MANUFACTURERS

Investigate this NEW METHOD of light metal fabrication. Ask for bulletins and folder showing accomplishments with Weldex Welders.

Suggest Procedure for Repair of Aluminum Boats

MANY aluminum boats are now being used for pleasure rides, hunting and fishing. The unlucky owner who finds a jagged crack in the hull should not despair, according to Charles Bruno, Reynolds Metals Co., Louisville. The boat can be repaired.

First, Mr. Bruno emphasizes only a welder who has had some previous experience in the welding of aluminum should attempt such repairs. Any tears or breaks located 6 in. or more from a wood member can be repaired without removal of the wood member. If the break is closer than 6 in., however, the wood member must be removed because the high thermal conductivity of the aluminum may spread a charring or burning heat to the wood.

Welding is done from the outside of the hull. The boat is therefore turned bottomside up, in such a position that the seam to be welded is at the top and in a flat horizontal position. Torn metal should be straightened and formed back to the original position by means of a mallet made of leather or hard rubber. All metal surface within about an inch of the crack should have paint or varnish removed by sanding it with a fine emery cloth of 180-grit or finer.

The inert-arc method (using argon gas) can be used to good advantage where the special equipment it requires is available. In most cases, however, welding will be done with the oxy-acetylene welding torch, using a No. 2 welding tip. A good aluminum welding flux should be mixed with water to form a paste suitable for brush application. After the flux has been painted on and around the crack, welding may begin. It is not necessary to back up the seam during welding. A 3/8 or 5/32 in. filler rod of 5% silicon, 95% aluminum, is recommended for repairing Reynolds hulls of 0.064-in. R361 aluminum alloy.

If the crack is over 6 in. long, welding must begin by tacking the seam at 1-in. intervals to avoid buckling and distortion. The base metal should be puddled with the filler rod, care being taken not to overheat the metal, which could easily result in melting away a section of the hull.

After welding, the outer surface should be ground smooth with the hull. Inner surface may also be ground smooth if desired. If the grinding fails to remove all of the surplus flux, it may be taken off with a 5% solution of nitric acid applied with a rag or brush. Clear water should be used to rinse off all of the acid afterwards.

* * *

Nelson Sales Starts Bimonthly House Organ

NELSON SALES CORP., Lorain, O., has begun publishing a new house organ to appear twice a month. It will describe various applications where cost savings were effected by stud welding or where the design and appearance of the finished product were substantially improved.

Ryerson Completes New San Francisco Plant

As an added service to steel users on the west coast, Joseph T. Ryerson and Son, Inc. has completed a new steel distributing plant at Emeryville, Calif. Wayne D. Dukette, formerly manager of the firm's Cincinnati plant, is in charge, while Ray C. Page is sales manager.

Main building is of steel frame construction with side walls of windows and a special type of metal siding. It is 72 ft. long and 220 ft. wide. A two-story office building of the same construction is an integral part of the warehouse.

Operating equipment consists of the latest and most efficient types of high speed handling and cutting machines. Six overhead bridge-type cranes serve every corner of the plant. Flame-cutting machines, friction saws, hack saws, bar, angle, sheet and plate shears and other tools and machines for cutting and handling steel have been installed.

* * *

Illinois Manufacturers Organize Scrap Drive

RECOGNIZING that the present critical shortage of steel scrap is holding back fuel production, the Illinois Manufacturers' Association is organizing scrap collection drives to help meet the nation's need for more and more steel. The program suggested by James L. Donnelly, executive vice-president of the association, includes appointment of a salvage man with authority to collect scrap, at each plant, a complete screening of the plant for available scrap and eventual sale through normal trade channels. This drive is aimed at all industries, including those which use no steel in the manufacture of their products.

"Last year 3,000,000 tons of steel ingots were lost to American Industry, largely due to the serious scrap shortage," said Mr. Donnelly in announcing the drive.

* * *

U. S. Steel Supply Buys California Facilities

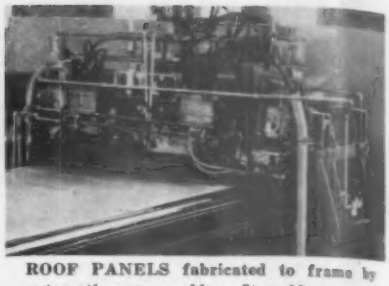
WAREHOUSE and facilities of Columbia Steel Co., 1940 Harrison St., San Francisco, have been purchased by United States Steel Supply Co. Both firms are subsidiaries of U. S. Steel Corp.

Frank B. Stewart, assistant district manager in this area, will be in immediate charge of the new addition. District Manager Clifford W. Lord will have jurisdiction over both the San Francisco and Los Angeles warehouses of U. S. Steel Supply.

* * *

Tank Co. Installs Welding Facilities

COMMERCIAL TANK CO., a new concern recently formed in New Castle, Pa., has installed new machinery and welding equipment for the manufacture of all types of storage tanks.



ROOF PANELS fabricated to frame by automatic seam welder. It welds one end and sides. Door frames are also welded

Spot-Welded Doors Lighter and Stronger

BY designing its trailer doors for fabrication by resistance welding, the Fruehauf Trailer Co. is obtaining doors of greater strength and less weight. In addition floor space needed for fabrication has been reduced and production bottlenecks eliminated.

Three automatic spot-welding presses are used for assembling the basic door framework, plus a turntable fixture at which brackets are attached with portable welding guns. Of the 250 spot welds, 168 are made automatically in the three multiple spot welders. These machines can interchangeably weld a wide variety of sizes of both left and right hand frames. Spring-loaded locating pins locate and lock dies and gun carriers in position for a given type and size of door.

Fruehauf is rapidly expanding production of its truck bodies, and its Kansas City plant is expected to reach an eventual capacity of 1,000 bodies per month. The company has invested $350,000 in special jigs, fixtures, tools and machinery.

* * *

New Distributors

REYNOLDS METALS CO., Louisville, Ky., has appointed the Hamilton Steel Co., 12875 Taft Road, Cleveland, and Arthur C. Harvey Co., Harvey Steel Road, Allston District, Boston, as distributors of its aluminum mill products.

* * *

McKAY CO., Pittsburgh, has appointed Johnson Welding Equipment Co., Chicago, as distributor of its mild-steel, alloy-steel, and stainless-steel electrodes.

* * *

THE HOBART BROTHERS CO., Troy, O., has appointed Island Supply Co., Grand Island, Neb., as distributor of its complete line of a-c/d-c arc welders, accessories and welding electrodes. They will give complete sales and service coverage.

* * *

WILSON WELDER AND METALS CO., INC., New York City, has appointed Industrial Air Products Co., 3200 N.W. Yeon Ave., Portland 10, as its exclusive distributor in the state of Oregon.

* * *

AMPCO METAL, INC., Milwaukee, has appointed Industrial Instrument Co., Milbury, O., as its Toledo distributor.

About People

REYNOLDS METALS CO. has named SUBLETTE M. WALTON as industry manager of its Alumi-Drome division. Mr. Walton will be in charge of sales and all operation connected with the Alumi-Drome, Reynolds' new all aluminum, self-supporting, all purpose utility building. At the same time RAY W. CHRISTENSEN was named assistant advertising manager for the Aluminum division. Mr. Christensen will concentrate on the advertising and sales promotion of mill products.

* * *

STEPHEN B. OWINGS, formerly assistant supervisor of the welding electrodes and equipment divisions of A. O. Smith Corp., has joined Glenn-Roberts Co. as assistant manager and chief engineer. He will make his headquarters at the company's Indianapolis plant. Mr. Owings brings to his new position twelve years experience in the arc welding industry.

* * *

DR. JOHN T. RETTALIATA, director of the department of mechanical engineering at Illinois Institute of Technology, will become dean of engineering next September. He will fill the position vacated by JAMES C. PEEBLES, who has been with the Institute more than 40 years. Dr. Rettaliata is a leading mechanical engineer and steam and gas turbine expert.

* * *

DAVID C. AFFLECK was recently promoted assistant chief engineer of Carnegie-Illinois Steel Corporation's Gary steel works. Also named to a new position is THOMAS W. HUNTER as tin mill division superintendent. He succeeds W. GUY HOFFMAN, now flat rolled products engineer in Carnegie-Illinois general offices in Pittsburgh.

* * *

L. M. KEATING, assistant to the president in charge of distribution of the A. O. Smith Corp., has been appointed executive administrator of the company's Southwest district office in Houston, Tex. Mr. Keating is a member of the American Welding Society, American Society for Metals and other groups.

* * *

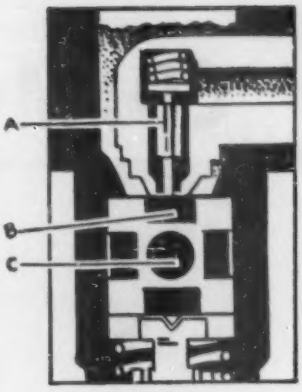
Reorganization of executive personnel of The Federal Machine and Welder Co., Warren, O., is as follows: ALLEN R. KELSO, executive vice-president and general manager of the Warco Press and Warren Stamping divisions; WALTER DINSE, vice-president and general manager of the Welder division; and HENRY A. STIX, treasurer and comptroller.

Built-in

Multi-Seats and Safe-T-Chek Valves

Meco make **REGULATORS**

DEPENDABLE & DIFFERENT



DEPENDABLE because these features give that extra margin of safety necessary to keep equipment operating on the job (where it counts). Diagram shows (A) Safe-T-Chek which protects regulator against damage possible from high pressure valve being opened with regulator screw open. (B) Shows operating seat and (C) Valve block with extra seats ready for immediate service in case of wear to operating seat. DIFFERENT—because *only* Meco has these important features *built-into* every regulator.

Meco

Send for your FREE Copy of the New Meco Catalog #130

Modern Engineering CO., Inc.

3411 PINE BLVD. ST. LOUIS 3, MO.

WELDIT GASAVER

- *Cuts Gas and Oxygen Cost!*
- *Eliminates Dangerous Fire Hazard!*

With Weldit Gasaver installed the operator simply hangs his torch on the handy lever rod of the Gasaver. The weight of the torch pulls the lever rod down, closing the valves of the Gasaver, thus shutting off both gas and oxygen intake lines. The usual idle flame and needless waste of oxygen and gas between operations is thus eliminated—no fire hazard or danger of injury to workers.

When the torch is again picked up for further welding operations, the operator passes it across the pilot light of the Gasaver, thereby instantly igniting the torch at the pre-adjusted flame, ready for work — no adjustments to make.

Gasaver can be installed any convenient place on the line between regulators and torch. Most of America's largest production plants are now Gasaver equipped.

Listed as standard by Underwriters' Laboratories and by New York City Board of Standards and Appeals.

Some distributor territory still available.

Weldit INC. SINCE 1918

994 OAKMAN BLVD. • DETROIT 6, MICH.

COLMONOY No. 1

For Hard-Facing Well Drilling Cable Tools

•

(For technical information on hard-facing, bits, drills and cable tools, write for Engineering Data Sheet No. 9.)

Colmonoy No. 1 is both tough and shock resistant. It won't chip, break off or spall, even under terrific punishment. It is at its maximum hardness when deposited, and is highly recommended for such applications as bull-dozer blades, cinder crusher rolls, crusher mantels, ditcher teeth, dragline buckets, dredge cutters, pulverizer hammers, roll crusher teeth, shovel teeth, tractor grousers and many others.

Colmonoy No. 1 is a flux-coated electrode, and is excellent for hard-facing carbon and manganese steels. It is but one item in a complete line of hard-facing alloys, using both the electric arc and oxy-acetylene welding. Write for catalog.

JOBBERS! Write us Regarding Territory.

WALL COLMONOY CORPORATION
Hard Facing Alloys
19345 JOHN R STREET • DETROIT 3, MICHIGAN

Arc-Flex
WELDING CABLE

IMMEDIATE DELIVERY FROM STOCK

ARC WELDING CABLE CONDUCTOR

A. W. G.	Amperes
6	75
4	100
3	150
2	200
1	250
1/0	300
2/0	375
3/0	450
3/0	550

DISTRIBUTORS—Write for Price Sheet No. 115B on Arc Flex Welding & Power Cable

ARC WELDING SUPPLY CO.
814 Southern Boulevard
Bronx, N. Y. C. 59, N. Y.

PIERCE GOVERNORS

•

PIERCE SERVO GOVERNORS

•

BELT-DRIVEN UNIVERSAL TYPES FOR ALL ENGINES

Special Governors for Chevrolet, Ford, Chrysler, Willys and most other standard engines.

•

See Your Welding Supplies Dealer or write to

THE PIERCE GOVERNOR CO., INC.
1607 Ohio Ave. Anderson, Indiana

H. E. CABLE is the new district manager of the Lincoln Electric Company's Pittsburgh office. Mr. Cable's work on the application of the automatic "Lincolnweld" process to the rebuilding of steel mill rolls and mine locomotive wheels has been responsible for large savings in such operations. He is a member of the American Welding Society, American Chemical Society, American Boilermakers Association and American Society of Mechanics.

At the same time J. S. ROSCOE was made district manager for the company's Chicago office. Mr. Roscoe has been active the past few years in developing the use of welding in the construction of machinery and heavy mill equipment in the Pittsburgh industries.

* * *

HOWARD J. ELGIN and CHARLES H. ROPER recently became vice-presidents of Steel Sales Corp., Chicago. Both men have been with the firm for about 13 years learning the business from the ground up. They are located at company headquarters in Chicago.

* * *

ANTHONY J. LANGHAMMER, president of the Amplex division of the Chrysler Corp., recently became the fourth recipient of the annual medal award by Stevens Institute of Technology for outstanding achievement in the field of powder metallurgy. Mr. Langhammer is the author of numerous papers and handbook data on tool steels and the various phases of powder metallurgy.

* * *

Recent personnel appointments in the American Brake Shoe Co. and divisions include: JOSEPH P. KLEINKORT as general sales manager of the Ramapo Ajax division; ROGER W. BATCHELDER as assistant to the president of the National Bearing division; WILLIAM H. OLD as general purchasing agent for the same division, and FRED P. BIGGS as first vice-president of Brake Shoe & Castings division.

* * *

Four managerial appointments have been made in the control divisions of General Electric's apparatus department. They are: M. H. BLESH, manufacturing, C. B. BRADISH, engineering, E. A. GREEN, sales, and THOMAS I. HOPE, as accountant for these divisions.

* * *

SAMUEL WENKS, metallurgical engineer, has joined the welding research technology staff of Battelle Memorial Institute, Columbus, O. He is a graduate of the Virginia Polytechnic Institute and a member of the American Society for Metals and the Army Ordnance Association.

* * *

ROGER M. BLOUGH, general solicitor for U.S. Steel Corp., recently announced the appointment of B. L. RAWLINS as assistant general solicitor of U.S. Steel Corp.

Precision ROD CUTTING at High Speed

with the New
DI-ACRO ROD PARTER

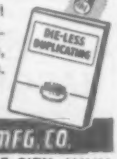
This newest member of the DI-ACRO "DIE-LESS DUPLICATING" family of Machines brings you accuracy, speed, capacity range and ease of operation fully up to standards of DI-ACRO Benders, Brakes, Shears.

Do you require precision? — DI-ACRO Rod Parter holds tolerance to .001" on duplicated cuts. The ends are square, and roundness is maintained.

Do you want speed? — The Rod Parter exceeds output of other methods with equal accuracy, on rods and bars up to ½".

"PARTS OFF" MANY MATERIALS—All hot and cold rolled rods, Stainless Steel, Chrome Molybdenum, Copper, Brass, Aluminum, Bi-metals.

GET "DIE-LESS DUPLICATING" CATALOG!
Shows parts produced without die expense by DI-ACRO Benders, Brakes, Shears, Rod Parters, Notchers, Punches.



Pronounced "Die-ack-ro"

DI-ACRO DIE-LESS DUPLICATING
O'NEIL-IRWIN MFG. CO.
385 8TH AVE., LAKE CITY, MINN.

SPOT WELDERS

BUTT WELDERS
GUN WELDERS
WELDING TIPS

Eisler manufactures a complete line of RESISTANCE SPOT WELDERS for all types of Welding. SIZES FROM ¼ to 250 KVA

TRANSFORMERS

FOR LIGHTING — FURNACES — POWER — PHASE CHANGING — ETC.

Eisler's Transformers are Built to Suit Any Job From ¼ To 250 KVA

also Manufacturer of Machinery for the Complete Production of Incandescent Bulbs, Radio and Electronic Tubes.

CHAS. EISLER
EISLER ENGINEERING CO., Inc.
749 So. 13th St. (near Avon Ave.) Newark 3, N. J., U.S.A.

DR. RAGNAR HOLM in collaboration with his wife, DR. ELSE, have joined the engineering staff of Stackpole Carbon Co., St. Marys, Pa., as consultants. Both worked in Europe prior to their association with Stackpole. Dr. Ragnar Holm is well known among physicists and electrical engineers in all countries, particularly for his contribution to the science of electric contacts, including the theory of friction and wear, of the electric arc and of material transfer in switching contacts.

* * *

Election of CHARLES LUKENS HUSTON, JR., as vice-president and ROBERT G. BLOOM as controller of Lukens Steel Co., was recently announced by the firm. In addition to his new duties, Mr. Huston will continue as executive assistant to the president. He has been with Lukens and its associates for nine years. In 1943, he was named president of Lukenweld, a division of the company, specializing in the designing, engineering and fabricating of steel plate structures by welding.

* * *

Recent personnel changes within the Allegheny Ludlum Steel Corp. include: R. J. BRYAN as plant manager of the Buffalo Foundry, DR. P. K. KOH as associate director of research in charge of tool and die steel and allied products, GEORGE I. BOTTCHER as assistant chief engineer and C. M. BINNEY as assistant district manager of the New York sales district.

* * *

FREDERICK H. CASE, JR. is now field representative, public relations, for American Steel & Wire Co. He will have charge of public relations activities for the company in the plant cities of Worcester, Mass., New Haven, Conn., and Trenton, N. J.

* * *

Appointment of FRANK B. NEWBERT as assistant general purchasing agent for American Brake Shoe Co., was recently announced by WILLIAM B. GIVEN, JR., president.

* * *

DR. JOHN A. HUTCHESON has been appointed director of the Westinghouse research laboratories. He succeeds DR. L. WARRINGTON CHUBB, retired. Dr. Chubb is now a director emeritus and continues to serve in an advisory capacity.

* * *

New comptroller for U.S. Steel Supply Co. is FRED L. WARNKE, who was also elected a director and secretary of the firm. He takes the place of C. V. VERNOOY, now comptroller of the Geneva Steel Co.

* * *

LEON NORFLEET has been named industry manager of Reynolds Metals Company's marine division. He will be in charge of sales of Reynolds aluminum boat and other marine products of the company.

JOHN TILLMAN & CO.
TRADE MARK
PROTECTIVE LEATHER SUPPLIES

GLOVES
MITTENS
GARMENTS

LEATHER for WELDERS

OUR LEATHER IS SPECIALLY TANNED FOR HEAT RESISTANCE AND LONG WEAR

COWHIDE — CHROME TANNED FOR LOW SHRINKAGE

DEERSKIN — CHROME TANNED FOR SOFTNESS

BRAZILIAN DEERSKIN WILL STAY SOFT AS LONG AS WORN

• • •

LEATHER WORK GLOVES
for
Truckers — Oil Field
Swampers — Linemen
General Utility Gloves

SEND FOR CATALOG
JOHN TILLMAN & CO.
1501 W. 19th St., Long Beach, Calif.

WHO SAID SOMETHING DAMAGED COULDN'T BE MADE AS GOOD AS NEW?

Amco Galvanizing Compound definitely repairs damaged galvanized surfaces so they are as good as new.

Damage caused by welding, forming, bending, fabricating, riveting, threading, abrasion, assembly is repaired by Amco Galvanizing Compound in a few minutes, for a few pennies.

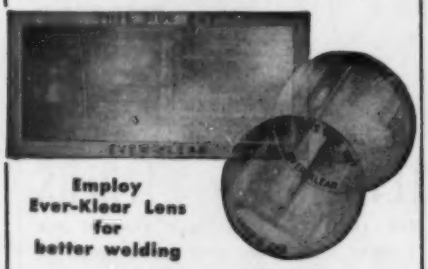
Equal in strength and corrosion resistance to the original hot-dipped galvanized surface. Easily applied by unskilled labor. Bonds perfectly to base metal without damage to surrounding galvanizing. In powder, stick and bar form.

Write on your letterhead for free sample.

AMERICAN SOLDER & FLUX CO.
2156 E. NORRIS ST., PHILADELPHIA 25, PA.

EVER-KLEAR COVER LENS

EIGHTEEN YEARS OF PROVEN SERVICE



Employ Ever-Klear Lens for better welding

DON'T LET FAULTY VISION RUIN YOUR EYES OR YOUR WELDS

Pitted glass occurs within minutes when plain glass is used, causing poor vision. EVER-KLEAR Cover Lenses keep your vision clear, and your welds up to par. They will not pit or become cloudy with fused metal adhering to the surface.

•

Size 2x4¼" for arc-welding shields.....$2.40 per dozen

Sizes 46½ to 50 M.M., for goggles..... 35c per pair

•

F. R. FAULK, Distributor

405 Penn Ave. Pittsburgh 22, Pa.

Test and Compare

A-LUM-ITE

for

BRAZING ALUMINUM AND WELDING WHITE METAL

—Check these results

* 1. Weld stronger than parent metal
* 2. Ease of application. No Flux
* 3. Economy in time and method

Aluminum brazing problems solved easily and quickly with A-lum-ite.

Write today for free literature and samples—analysis of your specific problem.

UNITED WELDING SERVICE CO.

FRANKLIN, PENNSYLVANIA

MANUFACTURERS

WILLIAM H. SCHUSTER, formerly welding engineer for Foster Wheel Corp., has accepted the position of welding supervisor for American Car and Foundry Co. Mr. Schuster is a member of the American Welding Society and the author of "Arc Welding Instruction Manual" for shipyard welders.

• • •

Mid-States Equipment Corp., Chicago, has named WILLIAM P. GOOD and VIRGIL CARLSON as heads of the applied welding engineering and electrical engineering departments, respectively.

• • •

DALE D. SPOOR has become manager of Air Reduction Sales Company's new equipment sales department, a consolidation of the firm's apparatus and arc welding departments. IRA B. YATES will manage the sale of arc welding equipment and supplies with J. F. CARROLL as manager of apparatus sales.

• • •

ROBERT C. MEYERS has succeeded R. J. RITCHEY as manager of Carnegie-Illinois Steel Corporation's market development division. Mr. Ritchey assumes directorship of the new market development division of U.S. Steel Corp.

• • •

Named to the position of Chicago district chief engineer of Carnegie-Illinois Steel Corp. is SIGURD LANDEN. Succeeding him as chief engineer of Carnegie's Gary works is J. DONALD ROLLINS.

• • •

JOHN S. GODLEY has been named sales representative for Nelson Sales Corp. R. E. MCGINNIS succeeds Mr. Godley in the company's Detroit area. He will cover northwestern Ohio with headquarters in Toledo, O.

• • •

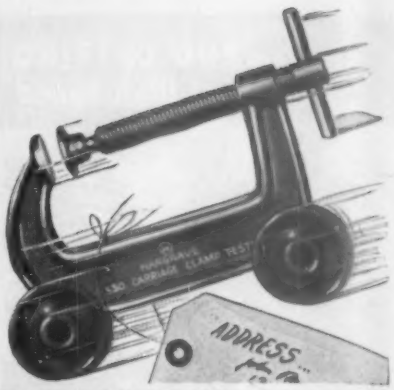
LUCIEN EATON, consulting engineer of Milton, Mass., was named chairman of the Mining Standardization Correlating Committee of the American Standards Association at its February meeting.

• • •

ANDREW J. LACOCK is now New York district sales manager for Lukens Steel Co. and its divisions, By-Products Steel Co. and Lukenweld, Coatesville, Pa. Mr. Lacock will make his headquarters at 50 Church St. N.Y.

• • •

LEE STRATTON, formerly domestic sales manager of the Crosley division of the Avco Mfg. Corp., is now merchandise director of the parts division of Reynolds Metals Co.



DELIVERY DATE... *Now!*

Ⓗ HARGRAVE

NO. 530 CARRIAGE CLAMP

High-level production now assures fast shipment from stock of top-quality Hargrave No. 530 Carriage Clamps. The frame, built of a powerful new metal, is far stronger than malleable . . . proved under individual Power Tests. Solid steel pin is same as furnished on our forged steel carriage clamps for the past four years.

WRITE FOR CATALOG OF COMPLETE LINE. See Your Nearby Industrial Distributor.

Ⓗ HARGRAVE

The Cincinnati Tool Co.

1944 Waverly Ave. Cincinnati 12, Ohio

Alweld

THE COMPLETE LINE OF CYLINDER TRUCKS

Tandem-Type Cylinder Truck unloads easily from front and rear. Available with semi-pneumatic tires. Carries all sizes of cylinders. Order from your distributor. Write for literature.

Distributorships available.

WELDED TRUCK AND SPECIALTY CO.

1849 W. Grand Ave., Chicago 22, Illinois

"ANTI-BORAX"

FLUXES

Have Always BEEN

Low Temperature Fluxes

Gas Saving Fluxes

SO IMPORTANT . . . . .

YET COST SO LITTLE

"Anti-Borax" Fluxes are GOOD . . . they are GUARANTEED. For best results in welding cast iron, brass, bronze, malleable iron, stainless steel, and aluminum use "ANTI-BORAX" Fluxes.

- No. 1 Cast Iron Welding Flux
- No. 2 Brazing Flux for Brass, Bronze, etc.
- No. 4 "Brass-Cast" Flux for Bronze Welding Cast Iron
- No. 5 Aluminum Flux for Cast Aluminum
- No. 8 Aluminum Flux for Sheet Aluminum
- No. 9 Stainless Steel Welding Flux
- No. 11 Tinning Compound
- No. 16 Silver Solder Paste Flux

Send for free samples

Manufactured only by

ANTI-BORAX COMPOUND CO.

FORT WAYNE, IND.

W-AL-CO RODS

for Welding of ALUMINUM

ELECTRIC AND GAS WELDING

Drawn Wire

Types 25, 43 and 52

Brazing 716 (low temperature)

FOR CAST ALUMINUM

Use Extruded Rods

Types 142, 195, 355 and 356

for Better Welding

3/16" size only

Aluminum Solder

White Metal

Welding Alloys Manufacturing Co.

744 Broad St., Newark 2, N. J.

Following are the names and respective districts of the new vice-presidents of Air Reduction Pacific Co., new subsidiary of Air Reductions Sales Co., Inc.; L. A. HAMILTON, Seattle; E. W. MACCORKLE, JR., Portland; H. W. SAUNDERS, San Francisco; H. A. HOTH, Los Angeles.

* * *

JOHN R. GAUT is now assistant manager of Chicago district operations of American Steel & Wire Co., while NELSON W. DEMPSEY takes over as general superintendent at Waukegan Works succeeding Mr. Gaut. VERNON L. STROM fills the position of division superintendent of the wire mills.

* * *

Allegheny Ludlum Steel Corporation recently named MERLE J. GRAHAM as manager of its West Leechburg, Pa., plant. FRANK G. BENFORD is assistant plant manager.

* * *

WILLIAM J. PRIESTLY, vice-president of Union Carbide and Carbon Corp., in charge of the alloys and metals division, has been elected a director of the firm.

* * *

DONALD L. ANDE has accepted appointment to the position of district manager of United States Steel Supply Company's Baltimore warehouse.

* * *

New assistant Chicago manager of the manufacturers products sales department of American Steel and Wire Co. is STUART W. GOODENOUGH.

* * *

WILLARD K. FOHL was recently named manager of service for Lukens Steel Co. and its divisions, By-Products Steel Co. and Lukenweld, Coatesville, Pa.

* * *

NORMAN B. JOHNSON, assistant executive vice-president of Pullman-Standard Car Mfg. Co., has been named to head all activities relating to operation of Pullman Car Works, Chicago passenger car division.

* * *

M. A. BOYLE has accepted the job of sales manager of the solder division of Alpha Metals, Inc., Brooklyn. He will continue his duties as a traveling consultant to manufacturers.

* * *

Died . . .

HARRY W. READE, apparatus sales manager for Air Reduction Sales Company, died suddenly at Jersey City, Sunday, February 15. During the war he served with distinction as chairman of the Manufacturers Committee of the welding cutting division of the War Production Board. Mr. Reade was active in both the International Acetylene Association and the American Welding Society.

Effective Protection

You increase production yet cut costs with Aircor Welder Filters, the permanent type filter for all welding machines. Aircor Filters stop injurious dust from entering welder. This positive protective action prevents sticking and arcing of brushes, clogging rotors, brush replacements, blowing out of machine and all other costly down-time for servicing.

For further information on these and other outstanding features, write for Bulletin 1145.

Air Filter Corporation

2514-5 West Lisbon Ave. • Milwaukee 5, Wis.

STOP WELDING FIRES *Quick!*

With its panic-proof trigger release, the Randolph Extinguisher gets into action quickly and smothers the fire with CO_2 in SECONDS. Many users attach a small Randolph to the welding truck where it is handy in every emergency.

Select Randolph. All sizes available. Approved by Underwriters'.

JOBBERS!

Join the 37 welding jobbers now handling the Randolph line. Write for merchandising plan.

RANDOLPH *Laboratories*

17 EAST KINZIE STREET • CHICAGO 11, ILL.

DOUBLE DUTY
from your Welding Torch
with a

BINGO
SOLDER KIT

Easy to Use . . . Bingo slips on over the tip of your welding torch and uses acetylene only.

Efficient . . . Provides and air-acetylene flame that is ideal for body soldering, tinning and silver soldering

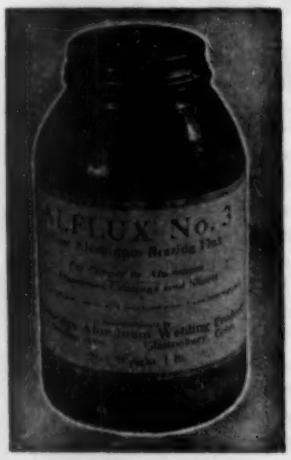
Economical . . . Comes complete with No. 1 and No. 2 tips for only $2.75 Savings in oxygen alone will soon pay for this kit

See Your Distributor or Order Direct

DISTRIBUTORS! Write for complete details.

BEAVERDELL Inc.
4465 Lincoln Ave. Chicago, Ill.

WOOLDRIDGE ALFLUX No. 3
CAST ALUMINUM BRAZING FLUX



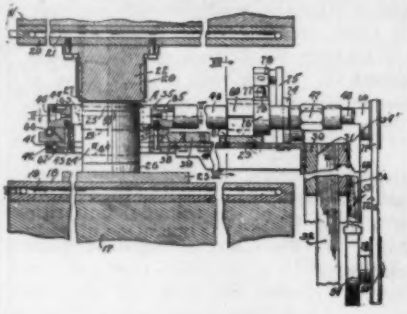
ALFLUX No. 3 is a multiple purpose flux which has been developed especially

for Soldering	*and Brazing*
Steel to Aluminum	Aluminum castings
Copper to Aluminum	Aluminum Sheets

This flux may also be used with good results on other metals. ALFLUX No. 3 is manufactured of the highest quality pure chemicals which have been thoroughly and carefully compounded. It is an exceptionally fine flux which adheres to the surface to be brazed and produces a faster and more economical weld.

WOOLDRIDGE ALUMINUM WELDING PRODUCTS, INC. Glastonbury, Conn.

From the Patent Office



Pressure Welder

2,435,702. PHILLIP W. VALLEE, Lakewood, O., assigned to THOMPSON PRODUCTS, INC., Cleveland. Filed March 30, 1944. Issued Feb. 10, 1948.

Pressure welder having coöperating platens each moving vertically with a horizontal arm carrying a torch ring between them. A vertical track is located outside of the space between the platens. There are means for raising and lowering the arm on the track to reciprocate arm and torch ring between platens. Vertical position of the zone of reciprocation may be varied with respect to one platen while maintaining a constant stroke so that the jet discharge may be directed against the pieces to be welded. This provision will raise the temperature regardless of the differences in constituents and sizes of pieces. It includes a vertical screw in threaded adjustment with the arm for endwise adjustment. A slide is adjustably connected to the screw with a rotatable cam to move slide screw and arm vertically.

* * *

Hard Facing Alloy

2,438,221. JACOB KURTZ TEANECK, and Enrico Zampieri, Union City, N. J., assigned to CALLITE TUNGSTEN CORP., Union City. Filed Aug. 13, 1942. Issued Mar. 23, 1948.

Process of making a hard facing alloy which comprises pressing into pellets and sintering about 95% by weight of tungsten carbide powder and about 5% by weight of iron carbide powder; preparing a melt of chromium and cobalt and adding and fusing the tungsten iron carbide pellets. Deoxidizing and grain refining material is added of the group consisting of calcium, silicon, manganese, boron, alloys of silicon, aluminum, and zirconium, and ferrous alloys of titanium, vanadium and chromium; and casting the same into ingots. The proportions of the ingredients forming the alloy are about 24 to 45% of tungsten, 1 to 5% of iron, 2 to 5% of carbon, 20 to 25% of chromium, 0.5 to 5% of deoxidizing and grain refining metal and the balance cobalt.

How to Get Good Paint-Grip On Welded Steel Assemblies

Oakite Compound No. 36 removes light oils, grease and rust from fabricated steel parts. In addition to this cleaning action, Oakite Compound No. 36 conditions surfaces by laying down an inert coating of paint-holding soluble phosphate salts.

Users of Oakite Compound No. 36 report a marked reduction in paint rejects; a speeding up of pre-paint procedures; important savings in production costs. Method of application (manual and mechanical) fully described in service report A-6174. Free copies gladly mailed on request.

OAKITE PRODUCTS, INC.
75 Thames Street, NEW YORK 6, N. Y.
Technical Service Representatives Located in Principal Cities of United States and Canada

OAKITE
Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

Watch for
The Annual Mid-June
PRODUCTS REFERENCE NUMBER

featuring—
The Welding Directory
A buyers' guide of welding products and kindred items listed alphabetically, with names and addresses of manufacturers.

Name and Address Section
A list of manufacturers of all types of welding equipment and supplies—and related products.

Trade Name Section
List of trade names, type of product and name and location of its manufacturer.

and—
Statistical Section
Facts and Figures on the Welding Industry.

* * *

THE WELDING ENGINEER

ALADDIN
ROD AND PATENTED METHOD

ALADDIN ROD

NO PUDDLING • NO FLUX

Weld White Metal
(POT METAL - DIE CAST)

Solder and Braze Aluminum Easily and Quickly with Gas or Carbon Arc . . .

ALADDIN ROD

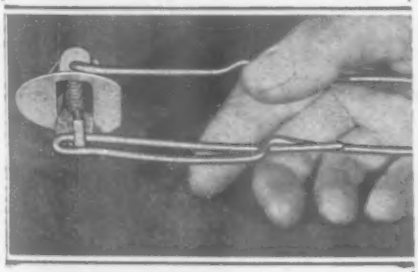
Melting Point 732° F. Tensile Strength lbs/Sq. in. 47,300. Shearing Strength lbs/Sq. in. 45,800. Meets Air Corps Specification No. 10302. Instructions with every pound. Sizes 1/32", 1/16", 1/8", 3/16", 1/4", and Complete Assortment.

PRE-WAR PRICES

SEE YOUR JOBBER OR WRITE US FOR INFORMATION

ALADDIN
ROD & FLUX MFG. CO.
GRAND RAPIDS, MICHIGAN
Cable Address "Aladdinco"

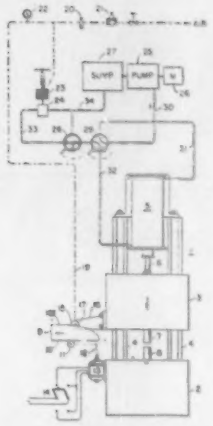
MOST ECONOMICAL



The Improved
"Round File" Gas Lighter

Unrivalled economy is provided by the many superior, exclusive design and construction features of the Improved "Round File" lighter. A large file area is provided—approximately one square inch. The file is of superior quality, hardened in our own factory. The spark metal is of large diameter and the patented cartridge holding the metal locks exactly into position, permitting instant replacement. Every part of the lighter is thoroughly tested.

SAFETY GAS LIGHTER CO.
Lynn, Massachusetts
Established 1901

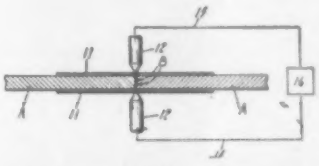


Spot Welder Control

2,435,026. Frederick A. Barnes, Cleveland Heights, O., assigned to Bailey Meter Co., Delaware. Filed June 26, 1944. Issued Jan. 27, 1948.

A spot welder having means for relatively moving a plurality of portions of the machine to perform a work operation. Controlled by a program template a portion of a control couple is positioned by the machine and a coöperating portion positioned by the template, with the timer positioning the template.

• • •



High Frequency Heating

2,438,155. Isaac M. Diller, Glen Ridge, N. J. Filed Aug. 4, 1945. Issued Mar. 23, 1948.

A process of welding the edges of metal bodies which comprises juxtaposing the edges to be welded and establishing between them, a zone having the qualities of a highly imperfect dielectric. Passing through this zone is an electric current having a frequency of the order of at least one megacycle per second, thereby heating the material in the zone by dielectric losses to fuse the edges into a weld.

• • •

R-W Electrode

2,436,205. Le Roy Deitz and Ivar W. Johnson, Schenectady, N. Y., assigned to General Electric Co., New York. Filed Dec. 20, 1946. Issued Feb. 17, 1948.

A pressure exerting, current carrying compact consisting of an intimate mixture of copper and carbon powders in which the percentage by weight of carbon present is about 0.25 to 0.75% of the mixture.

• • •

Automatic Electrode

2,435,800. James M. Sawhill, Towson, and James E. Skinner, Dundalk, Md., assigned to The Reid-Avery Co., Dundalk. Filed Jan. 22, 1946. Issued Feb. 10, 1948.

An electrode in the form of a stranded cable having a plurality of wires disposed as helices, each wire having a core of flux.

BRAZING RINGS
and Shapes
PREFORMED
Silver & Copper

Precision made from large stocks to your specifications

PROMPT DELIVERY
ATTRACTIVE PRICES
ENGINEERING SERVICE

Write for complete information and price lists

SAMPLES ON REQUEST

THE CLEVELAND PRECISION RING AND PRODUCTS CO.
4501 Prospect Ave.—Express 7373
CLEVELAND 3, OHIO

Get a Sample FREE and TEST it!

BULLOCK Coated ★
COVER GLASSES

They're SPLATTERPROOF!
WATERPROOF!
EASIER TO SEE THROUGH!
And they OUTLAST OTHERS 10 to 1

Write your name and address in the margin of this page and mail it to us . . . or send a letter. We'll send you sample glasses to test. You'll see in a hurry why Navy Yards, Shipbuilders, etc. used Bullock Glasses by the millions during the war.

Bullock Cover Glasses are coated on both sides. They last longer because their coating protects them against splatter, moisture, heat breakage. They stay clear, clean, uncracked 10 to 20 times longer. One Bullock Glass will last for days . . . no time out for changing . . . no blurred vision . . . no eyestrain. Tear this out now and mail it.

*DEALERS: You ought to be selling Bullock Cover Glasses. Write for terms

15c each
100 for $12.00
500 for $45.00
1000 for $67.50

L.H. BULLOCK CO.
2 EIGHTH ST.
RICHMOND, CALIF.

THE NEW "SUPER DE LUXE" GAS CYLINDER TRUCK

"SMOOTHEST TRUCK AFLOAT"

3 MODELS

CT-500—carries Oxy-Acetylene Cylinders of 100 to 285 cubic feet capacity.

CT-250—carries Oxy-Acetylene Cylinders of 60 to 120 cubic feet.

CT-100—carries Oxy-Acetylene Cylinders of 40 to 60 cubic feet.

- STURDILY CONSTRUCTED
- ALL-RUBBER TIRED
- ATTRACTIVE PRICES
- EXTRA WHEELS ON REQUEST

EXCELLENT WINDOW SALES APPEAL FOR YOUR GAS AND APPARATUS.

SOME TERRITORIES OPEN FOR MAJOR DISTRIBUTORS.

WRITE today for special quantity discounts.

manufactured by

NATIONAL WELDERS SUPPLY CO. Charlotte 1, N. C.

WELDING AND BRAZING **FLUXES**

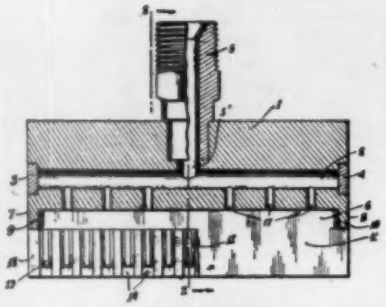
1. TIME SAVING 2. QUALITY PRODUCING 3. PERMANENCE IN RESULTS 4. COST REDUCING

★ When you are welding or brazing get the advantages of METAL BOND products. A type for every need. Each delivers quality results more easily and inexpensively.

★ Make your own test of METAL BOND products. Find out why METAL BOND is so widely used and why users standardize on these products.

★ Send for our handy-size catalog now. It contains much helpful welding, brazing and soldering information.

METAL BOND MFG. CO.
3201 KOSSUTH AVE.
ST. LOUIS 7, MISSOURI

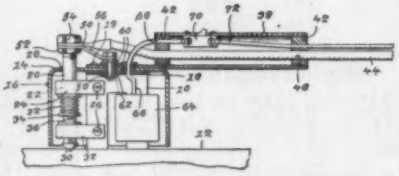


Heating Torch

2,438,170. HOWARD G. HUGHEY, Fanwood, N. J., assigned to AIR REDUCTION SALES CO. INC., New York City. Filed Dec. 7, 1944. Issued March 23, 1948.

A gas torch having a tip comprising an elongated block and a longitudinal channel. A second channel in the block is below the first and extends into the block from the discharge face. The second channel extends the entire length of the block with an insert completely occupying the second channel. Its upper wall forms a gas distributing chamber. This has a row of slots in a side face, which extends in a direction substantially at right angles to the discharge face of the block and are closed at their outer sides by an adjacent side wall of the block to form a longitudinal series of jet passages. These are in communication with the distributing chamber with means for supplying gas to it.

* * *



Welding Ground

2,437,633. OLIVER R. ABRAM, Glendale, Calif. Filed Nov. 12, 1943. Issued March 9, 1948.

An electric welding apparatus comprising a housing having an open bottom, a horseshoe-type electromagnet within and extending below the bottom. Guide arms are carried by one side of the electromagnet and a contact pin vertically movable is supported in the arms. Insulated bushings carried by the arms insulate the pin while a spring holds it in contact with the work.

* * *

Welding Rod

2,436,867. RICHARD K. LEE, York, Pa., assigned to THE MCKAY CO., York Pa. Filed Jan. 21, 1946. Issued March 2, 1948.

A welding rod comprising a core wire and a coating, being of such composition as to deposit at the weld locus a weld metal comprising carbon from 0.55 to 0.90%, silicon from 0.10 to 1.0%, nickel from 6 to 12%, chromium from 16.5 to 22%, and manganese from 1.5 to 5.0, the balance being iron except for the impurities usually found in commercial steels and the weld metal being at least part austenitic and rapidly work hardenable.

WHERE TO BUY

6714 Bryn Mawr Ave.

SEARCHLIGHT SECTION

(CLASSIFIED ADVERTISING)

Sales Engineer to represent California Manufacturer of arc welding electrodes and welding machines. Must have comprehensive knowledge of arc welding problems to call on dealer and consumer accounts. Territory in Nation's fastest growing industrial area. State fully: Education, Experience and salary desired. All Applications are confidential.

S.W. 4373 Welding Engineer
68 Post St., San Francisco 4, Calif.

Welding Eng. —No. 20542 for MAY
REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

WANTED: GAS welding sales engineer. Must be familiar with the gas welding process and the equipment. State education, experience, and present salary. P-4343, Welding Engineer.

SELLING OPPORTUNITY OFFERED

REPRESENTATIVES WANTED for nationally known manufacturer of Arc Welding Equipment. Some select territories open. RW-4489, Welding Engineer.

SELLING OPPORTUNITY WANTED

SALESMAN ELECTRIC welding experience, young free to travel wishes position with welding company sales force with training facilities one year experience selling aluminum and steel welders. SA-4372, Welding Engineer.

BUSINESS OPPORTUNITIES

For Sale. Welding Shop

Western N. Y. Close to city line of large city in heavy industrial zone, one block from rail siding. 6 welding machines, spot welder, southbend lathe—16" swing, large drill press, hack saw, air compressor. Building 12" cinder blocks, 38x60 ft. Traveling crane length of shop. Room for expansion. Property 80x225 ft. BO-4538, Welding Engineer.

Welding Shop

Specializing in the welding and finishing of cylinder heads and blocks. Automotive machine shop and automotive parts store of industrial parts. 1947 business $100,000. Employ (15) men—non union. Good lease on fireproof building, 30x120 with good basement (machine shop in basement). Selling because of poor health. BO-4407, Welding Engineer.

Patent 2,414, 750 for sale.

Hand operated flame cutting machine for circles and holes. Details upon request. BO-4470, Welding Engineer.

PROFESSIONAL SERVICES

LANCASTER, ALLWINE & ROMMEL
Registered Patent Attorneys

Patent Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request.
Suite 430, 815-15th St., N.W., Washington 5, D.C.